THE IRON TRADE REVIEW

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GREATER ACTIVITY

AND BRIGHT PROSPECTS IN THE IRON TRADE.

Last Year's Ore Prices Reaffirmed—Buying Started — Mills Long Idle Will Resume.

The outlook in the iron trade is now more favorable than at any time since the fall of 1907. The menace of prices being too rapidly advanced is the only cloud in the sky. The recent increase in demand for both finished products and pig iron shows a tendency to recuperate more promptly than was anticipated. When the market for finished steel products was thrown open last February, it was the impression in well posted quarters that it would require a couple of months for the trade to recover from the shock and for buying to commence on a really liberal scale. In barely two months the buying movement was well under way, and in less than three months there is a distinct trend toward better conditions. The steel industry is really prosperous in most of its branches, and in some lines the tonnage output is very close to the best on record. All this year the country has been producing pig iron at a rate very close to 22,000,000 tons a year, which is less than 4,000,000 tons short of the best output in any calendar year. The Steel Corporation is now operating 69 per cent of its blast furnace capacity, which, in view of the Gary improvements, is about 75 per cent of what was normal a year ago. In spite of this fact, Corporation stocks of pig iron are low. The three Ensley furnaces which were running on basic to supply the steel works, have shut down, and four furnaces at Bessemer have been started on foundry grades. Within the next month, three furnaces at the South Chicago works, now being repaired, will be blown in. The Bellaire, O., plant of the Steel Corporation will soon resume after an idleness of 17 months. The Corporation has appropriated $6,000,000 for the building of 560 by-product coke ovens at Gary, on which construction has been started. Work on new construction at the Aliquippa plant of the Jones & Laughlin Steel Co. will soon be resumed.

Steel Rail Production

Some conspicuous exceptions to the general buying have pulled down the general average. Rails, for example, are being turned out at the rate of about 2,000,000 tons short of the record year, and cars and other railroad supplies are far behind. If allowance were made for these, it would doubtless be found that in merchant mill products and tin plates the steel industry is doing about as well as it ever did, while in pipe, wire and sheets, it can not be far behind. The production and consumption of these lines necessitate much more activity per ton than do rails and other heavy material.

Iron Ore Sales

Last year's iron ore prices on Lake Superior iron ores have been reaffirmed, and sales amounting to nearly 2,000,000 tons have been made. Eastern Pennsylvania interests have purchased 100,000 tons of Swedish iron. Iron ore on dock May 1 amounted to 5,370,268 tons, a decrease of 110,032 tons compared with May 1, 1908. The total shipments from Lake Erie ports during the year ending May 1 amounted to 20,524,523 tons, compared with 31,692,446 tons for the year ending May 1, 1908. The strike of lake seamen and other unions on the lakes has continued, attended by considerable violence. With over 5,000,000 tons on docks, a much larger tonnage in furnace yards, and a fair movement of lake vessels, there is no danger of an ore shortage.

Pig Iron Conditions

The pig iron market continues fairly active, and there has been more buying of steel making grades. Southern iron for prompt shipment is rather weak, and the outlook for the last half is not entirely satisfactory. Valley prices are firmer.

Shapes and Plates

About 40,000 tons of structural material was taken last week by independent interests. The leading interest was not active. Prices in the central west are firmer, but competition has been very strong in the east, and some low prices have been named. New boats being figured on for lake and ocean service will require from 40,000 to 50,000 tons of plates and shapes. The Minneapolis Steel Machinery Co. has taken the contract for 2,500 tons for a riveted pipe line in Montana. Quotations on plates are firmer, the usual price being 1.30c, but this is shaded by some interests to 1.25c.

Steel Bars

As usual, agricultural implement manufacturers are driving better bargains than other consumers of steel bars, and some contracts are being made with implement concerns up to July 1 at an advance of $1 for delivery after Jan. 1. Other interests have difficulty in making contracts beyond Oct. 1, although some large consumers have contracted to Jan. 1. The price of bars seems to be firm at 1.20c Pittsburg. The demand for wire continues active, and the recent advance in price has been well received.

On the Reading track elevation work at Philadelphia, involving 17,000 tons of structural material, the McClintic-Marshall Construction Co. was the low bidder.

THE WEEK IN IRON CENTERS

PITTSBURG.

Prices of Finished Materials Established at Higher Levels.

Office of THE IRON TRADE REVIEW,
510 Park Bldg., May 11.

From the standpoint of prices, the iron and steel trade has recovered lost ground until at present it is holding at practically the point at which the open market established buying and selling levels almost three months ago. The recent upward movement from the low marks touched has followed from the heavy tonnage that has been placed with the mills and it has gradually resulted in the elimination of the weakness that has been apparent in some sources. During the past week makers established steel bars at 1.20c Pittsburg and plates and shapes at 1.30c Pittsburg as the general market for this year's delivery. These are the quotations at which the market was ruling before aggressive competition precipitated severe concessions.

The present situation shows the position of makers to be much improved and one more likely to warrant a consistent adherence to current prices. Mill books have been well filled with tonnage intended for immediate consumption and running orders are of a steady volume. Increased operations are to be noted and, in a few instances, plant capacities are being pushed. Sentiment among both buyers and sellers has strengthened in a marked degree and the former appear to be realizing that present conditions afford a favorable opportunity to cover for their requirements as far ahead as the producers are willing to accept.

Among some interests deliberation in the advancing of prices is being counseled, lest too rapid action may tend to impede the progressive movement of the industry. It is felt that the most probable source of obstruction which the expanding demand is facing would arise from too aggressive policies for the restoration of former conditions. The movement in pig iron is upward, but the market has not wholly passed beyond the stage of low selling. Old material is stronger and higher.

Pig Iron.—The recent greater activity in pig iron is giving a stronger sentiment to furnace interests and it has resulted in advances in prices being individually made by a number of makers. The soft spots in the situation are being gradually overcome, but some still remain and low sales have been made within the past few days. The upward tendency of the market is clear, however, and higher quotations soon are generally expected, if the present improvement is sustained.

Greater buying in the immediate Pittsburg district is to be noted and this has been well divided among Bessemer, basic and foundry grades. Considerable Bessemer and basic iron is being quietly closed for prompt and extended shipment. A local steel company bought 3,000 tons of basic for last half delivery at a shade under $14 valley, closing on this transaction the latter part of last week. Prompt Bessemer has been holding at $14.50 valley and some iron has been taken at this price for extended shipment, although some low sellers have elevated their quotations and with others are asking $14.75 and $15, respectively, for prompt, third and fourth quarter metal. Among the Bessemer sales reported are 500 tons or prompt to a local steel company, 500 tons of prompt to a valve company, and 800 tons for last half to a northern Ohio foundry. Other heavier sales have been made to points outside this district. In low phosphorus a lot of 500 tons for third quarter went to a local foundry at $20.50 delivered.

Foundry iron has been raised to $14.25 valley for prompt or nearby shipment, and some makers are asking more. A mild movement in this grade is under way in this district, melters buying prompt, third quarter and last half iron. Sanitary manufacturing companies contracted for about 4,000 tons of No. 2 and gray forge in the week and a locomotive company purchased several thousand tons of No. 2. Malleable is firmer.

One of the principal inquiries now before sellers is for 6,000 tons of basic for last half for a Canton, O., interest.

On prompt and second quarter delivery on northern iron, we quote as follows:

Bessemer, valley	$14.50 to 14.75
Bessemer, Pittsburg	15.40 to 15.65
No. 2 foundry, Pittsburg	15.00 to 15.15
Gray forge, Pittsburg	**14.40 to 14.65**
Basic, valley	14.00 to 14.25
Basic, Pittsburg	14.90 to 15.15

Ferro-Alloys.—A further strengthening in some grades of ferro-alloys is apparent, 50 per cent ferro-silicon, especially, ruling higher. Ferro-manganese also appears firmer. There is a fairly good general inquiry and considerable prompt business is going. We quote 80 per cent ferro-manganese at $41.50 to $42, seaboard, with a freight rate of $1.95 to Pittsburg.

Fifty per cent ferro-silicon is quoted at $62 to $63 Pittsburg on forward deliveries; domestic, 12 per cent, $26; 11 per cent, $25; 10 per cent, $24, Pittsburg.

Plates.—Contemplated new boat construction in lake and ocean yards now being figured upon will require from 40,000 to 50,000 tons of plates and shapes, it is estimated. For the lake trade, the Pittsburg Steamship Co. is planning two additional steel freighters while several other ship interests are each considering the building of an additional vessel. The Hawaiian Steamship Co. is taking figures on three steel ships for coastwise service, which will require upwards of 15,000 tons of steel material. Other boats for coast trade are before the market. The Anaconda Copper Co. has closed with the Minneapolis Steel & Machinery Co. for 2,500 tons of plates for a riveted pipe line in the western mining regions and about 5,000 tons for construction work by the same company are yet to be placed. The mills are receiving a very satisfactory volume of specifications in plates and are stiffening in their ideas of prices. Some of the large makers are now asking 1.30c on ordinary business and are not disposed to solicit contracts for extended deliveries. We quote the present market as follows:

Tank plate, ¼-inch thick, 6¼ to 100 inches, 1.30c f. o. b. mill. Extras are as follows per 100 pounds: Boiler and flange steel plate, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½-inch to and including 3-16-inch plate on thin edges, 0.10c; under 3-16 to and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—The stronger tone in the sheet market continues and the minimum quotations are better observed, although shading is still being done. There is considerable irregularity in the prices of iron sheets. Current orders to the mills are good and makers are showing a firmer position with respect to accepting business on extended contracts. The American

Sheet & Tin Plate Co. increased its operations this week by starting its Guernsey plant of 11 mills at Cambridge, O., which makes 123 mills or 66 per cent of its total capacity now going. The activities of the independents show little change. The Youngstown Sheet & Tube Co. is about to proceed with the doubling of its sheet mill capacity. We quote present minimum prices which are subject to some shading as follows:

Blue annealed sheets, Nos. 10 and heavier, 1.60c; Nos. 11 and 12, 1.65c; Nos. 13 and 14, 1.70c; Nos. 15 and 16, 1.80c; box annealed sheets, Nos. 10 to 12, 1.85c; Nos. 13 and 14, 1.90c; Nos. 15 and 16, 1.95c; Nos. 17 to 21, 2c; Nos. 22 to 24, 2.05c; Nos. 25 and 26, 2.10c; No. 27, 2.15c; No. 28, 2.20c; No. 29, 2.25c; No. 30, 2.35c; galvanized sheets, Nos. 13 and 14, 2.30c; Nos. 15 and 16, 2.40c; Nos. 17 to 21, 2.50c; Nos. 22 to 24, 2.65c; Nos. 25 and 26, 2.85c; No. 27, 3.05c; No. 28, 3.25c; No. 29, 3.35c; No. 30, 3.60c; painted roofing sheets, $1.55 per square for No. 28 gage, 2½-inch corrugation, and galvanized roofing sheets, $2.80 per square for No. 28 gage, 2½-inch corrugation.

Tin Plate.—Orders from the canning trade are coming in freely to the tin mills and current business is running at a very favorable gait. Some contracting up to October is being done. Prices are steady. An ordinary amount of terne plate business is being taken. Mill operations of the leading interest and the independents are at about the same percentage. The announcement that the Jones & Laughlin Steel Co. will erect a 30-mill tin plate plant at Aliquippa, Pa., has attracted much interest among tin plate makers by reason of the magnitude of the project. We quote present prices as follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.45 f. o. b. mill Pittsburg district and $3.40 in large lots. Terms, 30 days, less 2 per cent for cash in 10 days.

Rails and Track Material.—The effect of the recent advance in light rail prices has been to increase the interest of buyers of this material, and considerable business is being booked. During the past week the Carnegie Steel Co. took about 2,700 tons. The No. 3 mill, the light rail mill at the Edgar Thomson works is running at a better percentage. In standard sections the railroads are specifying fairly well against standing contracts, some of which have been on the books for a long time. Until these contracts are exhausted, there is not likely to be any further buying of importance. Some prompt business is being taken and several of the traction companies are giving releases on old contracts. The spike market is still affected by price disturbances and in exceptional cases lower than 1.60c Pittsburg has been done. On present specifications on Bessemer rails we quote as follows, the base price for open-hearth rails being $30 mill:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails in lots up to 250 tons, 8-pound, $29; 12-pound, $28; 16 to 25 pound, $27; 30 to 35 pound, $26.75; 40 to 45-pound, $26; on lots over 250 tons, prices are 60c less; angle splice bars for standard sections, 1.50c Pittsburg. Standard spikes, 1.60c to 1.70c Pittsburg; hand spikes, 1.60c to 1.70c Pittsburg.

Steel.—The semi-finished steel market exhibits greater firmness. Heavy orders on scale contracts for billets and sheet bars have strengthened the sentiment of makers and some of them have practically withdrawn from the market. In some cases steel works are being strongly pushed. Some concessions have been given on prompt material, but these appear more exceptional. It is reported that a sheet bar contract has just been placed with a northern Ohio consumer at a low price.

Bessemer and open-hearth 4 x 4 billets with 0.25 carbon and less are quoted at $23 Pittsburg, with the usual extras for size and analysis, and forging billets at $25 Pittsburg. Sheet and tin bars are $25 Pittsburg. Some steel makers are still willing to divide the freight within the $1 limit, making the price in the immediate Pittburg territory $23.50 delivered on billets and $25.50 delivered on sheet bars.

Hoops and Bands.—There is a greater willingness shown by buyers of hoops to contract for their requirements, but the mills are holding to a conservative policy in closing for future shipments. Mill orders are fair. Prices appear more regular. We quote the present market as follows:

Hoops in carload lots, 1.50c to 1.60c; in less than carload lots, 1.60c to 1.70c; bands, 1.15c to 1.20c, base half extras as per standard steel.

Merchant Bars.—The principal makers of steel bars continue to show stronger views in their selling activities and asking prices are tending upward. Toward the latter part of last week, several of the important interests announced a 1.20c base and are now consistently holding to this level on contracts to run the remainder of this year, although preference is shown not to extend these commitments beyond October. A heavy run of orders in bars is coming to the mills and a progressive increase in tonnage is being sustained. The Republic Iron & Steel Co. this week will start its Atlantic furnace at New Castle which will give it a full furnace capacity in operation, six stacks in the north and three in the south. The mills are paying less attention to the competition of the re-rollers. The increasing price of old material and the favorable comparative cost level of steel bars are combining to hold bar iron quiet. We quote current prices as follows:

Common iron bars, 1.30c to 1.35c Pittsburg; Bessemer and open-hearth steel bars, 1.20c; plow and cultivator, 1.20c; channels, angles, zees, tees, under 3-inch, 1.30c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size, 0.30c advance. Cold rolled and ground shafting, 60 per cent in carloads, and 55 per cent in less than carloads, delivered in base territory. Planished and machine straightened tire steel is 1.40c base; iron finished tire under 1½ by 1½ inches, 1.35c, both plus ½ extra on tire card; iron finished tire, 1½ by ½ and over, 1.20c, plus ½ extra on the steel bar card.

On cold rolled strip steel, width 1½ inches and wider, and 0.100 inch and thicker, we quote base prices for 100 pounds, $3.05 on hard, and $3.30 on soft.

Structural Material.—The recognized market of 1.30c on structural shapes appears to be better adhered to by makers in their selling policies, and any concessions now being made are on exceptionally desirable business. Fabricating prices have not, however, responded with any notable improvement. The inquiry for new construction work is quite fair. The railroads are closing for some small lots to fill in on extensive purchases made during the past several months. The American Bridge Co. has taken 300 tons from the Wabash and some small miscellaneous lots from the Pennsylvania, Pittsburg & Lake Erie and other lines. No award has yet been made of the West Penn hospital, 1,200 tons, for which bids have been received. Bids were taken this week on a county bridge at New Castle, 500 tons. It is expected that an award will be made this week for 800 tons for the new plant of the Phillips Sheet & Tin

Plate Co., Clarksburg, W. Va. Bids have been asked for the steel for the new Second National Bank building in this city. We quote the present market on structural shapes as follows:

Beams and channels, 15-inch and under, 1.25c to 1.30c; over 15 inches, 1.35c to 1.40c; zees, 1.25c to 1.30c; tees, 1.30c to 1.35c; angles, from 3 to 6 inches, 1.25c to 1.30c; over 6 inches, 1.35c to 1.40c; universal and sheared plates, 6¼ inches wide and wider, 1.25c to 1.30c.

Merchant Pipe.—Greater evidence of a stir among the many large oil and gas line projects which have been before the market is to be noted, and it is expected that some of these will develop into definite contracts in the near future, as prospective investors are apparently convinced that prices are at bottom. The merchant pipe movement continues strong and jobbers are desirous of making contracts for extended deliveries, but are finding difficulty in getting the mills to accept this business. Some of the large interests are shipping from stock and as a consequence, mill operations are not changing greatly. There is a steady demand for oil and gas field goods from Illinois, California, Oklahoma and other fields. Merchant pipe prices are firm, and in line pipe, quotations are more regular. We quote the following official discounts on merchant pipe subject to five off to jobbers, while a few of the very large jobbers with mill connections are given an additional one point off:

	—Steel—		—Iron—	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ inch.....	72	56	69	..
⅜ inch	73	59	70	56
½ inch	76	64	73	61
¾ to 6 inch.....	80	70	77	67
7 to 12 inch.....	75	60	72	57
PLUGGED AND REAMED.				
1 to 4 inch.....	78	68	75	65
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch.....	65	53	62	50
½ to 4 inch.....	72	60	59	57
4½ to 8 inch.....	68	56	65	53
DOUBLE EXTRA STRONG PLAIN ENDS.				
½ to 8 inch.....	61	50	58	47

Boiler Tubes.—The market rules quiet although some makers are booking a fair amount of orders. The merchant trade is disappointing as power consumption is not showing much gain. Some shading of prices is current. We quote the following official discounts on lap-welded steel boiler tubes to jobbers in carloads:

1 to 1½ inch.....	50
1¾ to 2¼ inch.....	62
2½ inch	64
2¾ to 5 inch.....	70
6 to 13 inch	62

2½ inch and smaller, over 18 feet, 10 per cent net extra.

2¾ inch and larger, over 22 feet, 10 per cent net extra.

To destinations east of the Mississippi river will be sold at delivered discount for carloads lowered by two points, for lengths 22 feet and under; longer lenghts, f. o. b. Pittsburg.

We quote the following official discounts on charcoal iron tubes to jobbers:

1 to 1½ inch.....	45
1¾ to 2¼ inch.....	45
2½ inch	50
2¾ to 5 inch.....	45
6 to 13 inch.....	45

Wire Products.—The reduction of prices in wire products by the American Steel & Wire Co. has stimulated much activity in this market and offerings are heavy. Jobbers and large consumers are endeavoring to close on their extended requirements at the present level, but the mills, following their policy originally announced, are not accepting orders unless accompanied by specifications for shipment within 30 days. The prevailing impression is that present prices will not continue for an indefinite period. Independent interests which are well filled for 30 days ahead are not aggressive in taking orders, although they have met the recent cut of the largest interest. The American Steel & Wire Co. increased its furnace operations in this district by blowing in its No. 2 stack at its Donora plant this week. We quote present prices as follows:

Wire nails, jobbers' carload lots, $1.60; retailers' carload lots, $1.65; painted barb wire, jobbers' carload lots, $1.60; retailers' carload lots, $1.65, with 30c for galvanizing; plain wire to jobbers in carloads, $1.40, and to retailers in carloads, $1.45; polished staples, $1.60; galvanized staples, $1.90.

Wire Rods.—Although no definite reduction in wire rods has been announced, prices have adjusted themselves at a lower point. We quote the present market at $28 Pittsburg on Bessemer and $29 Pittsburg on open-hearth rods.

Coke.—Considerable furnace coke for May and June shipment has been sold during the past week and low prices have generally ruled. Steel companies have been among the principal purchasers. There has been some selling for last half delivery and a number of inquiries are now being negotiated. Although there is greater activity in the market, price conditions show no improvement, and, if anything, lower figures are reported. Good shipments of foundry coke are going forward and a number of small contracts are being placed. We quote spot furnace coke at from $1.45 to $1.65 ovens and on contract from $1.70 to $1.75 ovens, according to grade. On first-class Connellsville foundry coke the range is from $1.80 to $2 ovens for prompt shipment and on contract from $1.90 to $2.25 ovens. The *Courier's* figures for the week ending May 1 show 21,665 ovens active, with an output of 229,507 tons, compared with 21,804 active ovens and a production of 230,229 tons the previous week.

Old Material.—The recent increasing firmness in finished iron and steel is giving a better tone to the old material market, and dealers are more bullish in sentiment. They are offering little material at the current level and are holding for higher prices. Buying by the mills is conservative, but prices are advancing. The Pennsylvania lines are offering this week a good-sized list, of which 12,000 tons are long rails, and the Baltimore & Ohio railroad is asking prices on from 5,000 to 6,000 tons, of which 2,000 tons are long rails. We quote gross tons delivered in the Pittsburg district as follows:

Heavy melting scrap, $14 to $14.50; re-rolling rails, $14.50 to $15; bundled sheet scrap, $11.50 to $12; iron axles, $19 to $20; old iron rails, $16 to $17; No. 1 wrought scrap, $14 to $14.50; old car wheels, $14.50 to $15; low phosphorus, $17 to $17.50; machine shop turnings, $9 to $9.50; cast borings, $8 to $8.50; No. 1 cast scrap, $14 to $14.50; malleable, $13 to $13.50; stove plate, $11 to $11.50.

CHICAGO.

Improvement in Heavy Steel Products —Fair Activity in Pig Iron.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, May 11.

A decided improvement in the condition of the market with regard to all of the heavier steel products characterized the past week. The position of all of the mills, both in the matter of price and willingness to contract, is unmistakably firmer and what is especially significant is the amount of buying that is being done by jobbers in replenishing stocks that for many months have been kept down to the lowest notch. The general buying for structural purposes involving shapes and plates has run into a very considerable tonnage. Large purchases are also credited to certain of the railroads. The leading interest in this market booked during the past week 175,000 tons of which 105,000 tons was standard rails. The leading item of this tonnage was the purchase of 60,000 tons by the St. Paul reported last week. On plates and shapes 1.25c Pittsburg is now the minimum price and the interest making this is offering it only for prompt specifications or for specific work. Other mills are holding at 1.30c and the prospect seems to be for a general settling of prices at that figure. Active contracting for steel bars on the part of implement interests was a feature of the week and the greater part of the re-

quired tonnage, which has been estimated as somewhat in excess of that engaged a year ago, is now understood to have been placed.

The new light rail schedules, advancing the price from $3 to $4 a ton, took effect last week. Specifications on track fastening contracts show improvement, but spikes are weaker. The reductions in wire products have served to maintain the tonnage largely for stocks for which the low prices offer a favorable opportunity. Scrap prices, while nominally firmer, show some weakness as the result of the tonnage coming into the market from railroads and the reticence of consumers. Pig iron is moderately active with a well distributed inquiry. The only large tonnage reported for the week was a purchase of 4,000 tons of malleable iron in the Milwaukee district. The northern situation is not strong, principally due to the fact that it is generally known that large stocks of iron exist.

Pig Iron.—A well distributed inquiry for iron in small lots is reported for the past week and a moderate tonnage was bought. The large sale of the week was 4,000 tons of malleable to the Northwestern Malleable Iron Co. at Milwaukee for which a price of $15.75 is understood to have been made. Only local switching charges were involved in the transaction. One southern interest reports sales of 1,100 tons at $11.50 for the third quarter and $12 for the fourth, but another southern interest to which are credited sales somewhat in excess of this amount is still offering $11.50 for the last half. This price is to all appearances firmly maintained. The northern situation offers less resistance to pressure and $16 at local furnaces is a maximum price for No. 2. Sales are not heavy and interest shows a tendency to drag. We quote as follows delivered at Chicago:

Lake Superior charcoal	$19.50 to 20.00
Northern foundry No. 1	16.65 to 17.15
Northern foundry No. 2	16.15 to 16.65
Northern foundry No. 3	15.65 to 16.15
Southern foundry No. 1	16.35 to 16.85
Southern foundry No. 2	15.85 to 16.35
Southern foundry No. 3	15.35 to 15.85
Southern foundry No. 4	14.85 to 15.35
Southern No. 1 soft	16.35 to 16.85
Southern No. 2 soft	15.85 to 16.35
Southern gray forge	13.85 to 14.35
Southern mottled	13.60 to 14.10
Southern silveries, 4 per cent silicon	17.60 to 18.10
Southern silveries, 5 per cent silicon	18.10 to 18.60
Southern silveries, 6 per cent silicon	18.60 to 19.10
Jackson Co. silveries, 6 per cent.	19.40 to 19.90
Jackson Co. silveries, 8 per cent	20.40 to 20.90
Jackson Co. silveries, 10 per cent	21.40 to 21.90
Malleable Bessemer	16.40 to 16.85
Standard Bessemer	17.00 to 17.50
Alabama basic	16.35 to 16.85

Billets.—A few sales of carload lots are reported, but new business in billets is quiet. No very great strength is exhibited in the matter of price and billets are reported sold at as low as $25.50 for forging purposes. We continue to quote on the basis of $21 Pittsburg for rolling billets, as follows: For 4 x 4 rolling billets, $24, and for forging billets, $26, Chicago base.

Merchant Bars.—The market for steel bars is distinctly firmer and the price which practically all of the interests are asking is 1.20c Pittsburg. This advance followed a period of fairly active contracting by the implement interests, during which time the larger portion of their requirements was covered. Nominally the contracts extend only up to Jan. 1, but it is generally accepted that the trend of business will determine whether or not deliveries are completed by that time. The agricultural implement people are still engaged in buying for their needs with respect to special shapes in merchant steel and this trade is active. The general activity is reflected in the much more conservative attitude of several of the mills, particularly those in the east. Trade in iron bars is not prominent and hard steel prices are still lamentably weak, 1.20c Chicago being a common price. We quote as follows:

Bar iron, 1.25c; soft steel bars and bands, 1.35c to 1.38c; half extras; soft steel angles, less than 3 x 3, 1.48c; hoops, 1.78c base, full extras, planished or smooth finished tire steel, 1.58c; iron finish, up to 1½ x ½-inch, 1.53c base tire card; iron finish, 1½ x ½-inch and larger, 1.38c base steel card; channel for solid rubber tire, ¾ to 1 inch, 1.88c, and 1⅛-inch and larger, 1.78c; smooth-finished machinery steel, 1.63c; flat sleigh shoe, 1.43c; concave and convex sleigh shoe, 1.63c; cutter shoe, 2.75c; toe calk steel, 1.93c; railway spring, 1.73c, base steel card; vehicle spring steel, 1.78c, base vehicle card; crucible tool steel, 7c to 9c, with higher prices asked on special grades. Quotations on shafting are 60 per cent off the list for carload lots, and 55 per cent off for less than carload lots, carload freight allowed to points in base territory. On iron and steel bars from local stocks, we quote as follows: Bar iron, 1.70c to 1.80c full extras; soft steel bars, 1.50c per 100 pounds base, plus half extras; soft steel hoops, 2.10c, full extras.

Plates.—Active contracting in plates, with heavy specifications, has brought about a decidedly firmer condition in the matter of prices. The mills with order books well taken care of for a satisfactory period into the future are disposed not to contract ahead and are inclined toward higher prices. Only prompt specifications, it is claimed, will command the lowest price. During the past week a large tonnage in the aggregate was taken by the leading interest, bridge builders and structural shops contributing a good portion of the buying. Jobbers' stocks also are being replenished to an extent such as would be expected only at the beginning of an upward movement. The minimum price at present appears to 1.25c Pittsburg, though the full freight differential of 18 cents is not absolutely observed. Some of the mills decline to quote less than 1.30c Pittsburg. For mill prices see Pittsburg report. Freight to Chicago, 18 cents. We quote for shipment from local stocks as follows:

Tank steel, ¼-inch and heavier, up to 72 inches wide, 1.60c to 1.70c; from 72 inches wide to 96 inches wide, 1.70c to 1.80c; 3/16-inch up to and including 60 inches wide, 1.70c to 1.75c; 72 inches wide, 1.95c to 2c; No. 8 up to 60 inches wide, 1.70c to 1.75c. Flange and head quality, 25c extra.

Sheets.—While some of the sheet mills for various reasons continue to be the occasion for weakness in prices of sheets, the leading mill in this market is losing some business because it was unable to afford the promptest delivery. From the standpoint of tonnage the situation offers little that is unsatisfactory. For mill prices, see Pittsburg report. Freight to Chicago, 18 cents. We quote store prices at Chicago as follows:

No. 10, 2c to 2.10c; No. 12, 2.05c to 2.15c; No. 14, 2.10c to 2.20c; No. 16, 2.20c to 2.30c; Nos. 18-20, 2.50c to 2.55c; Nos. 22-24, 2.55c to 2.60c; No. 26, 2.60c to 2.65c; No. 27, 2.65c to 2.70c; No. 28, 2.75c to 2.80c; No. 30, 3.05c; galvanized sheets, Nos. 10 to 16, 3c to 3.10c; Nos. 18 to 20, 3.05c to 3.15c; Nos. 22 to 24, 3.20c to 3.25c; No. 26, 3.40c to 3.45c; No. 27, 3.60c to 3.65c; No. 28, 3.80c to 3.90c; No. 30, 4.20c to 4.50c.

Structural Steel.—The season of extremely low prices for fabricated material has left an aftermath of suspicion that in certain instances very low prices are still being made, but there is no doubt that the average level of prices has moved up several dollars a ton. The situation with respect to plain shapes is also much firmer, following the several consecutive weeks of large tonnages placed. The contracting for fabricated steel during the past week was not very heavy. The Kansas City Structural Steel Co. will furnish 667 tons for the Gates building in that city and the Missouri Valley Bridge & Iron Co. took 300 tons for bridges. The Rumley Co. of LaPorte, Ind., award-

ed 425 tons for an addition, Trostle, the tanner at Milwaukee, let a contract for 975 tons and the Marathon Paper Mills at Wausau placed 2,700 tons of material for a factory building. The contract for a hotel at Oakland, Cal., carrying 1,400 tons, was reported as let as was also 2,200 tons of bridge steel for the Rock Island Railway system. The Minneapolis Steel & Machinery Co. will furnish 2,400 tons of plate work for the International Smelting Co. The Llewellyn Iron Wks., Los Angles, will fabricate 375 tons for a saw mill for the Pacific Lumber Co. and the Judson Mfg. Co. 305 tons for the Levi Strauss Realty Co. Preliminary figures are being asked on a 3,000-ton building to be erected on Madison avenue and Wabash. The outlook for new steel buildings is very encouraging. Prices for shapes from mill are not being offered below 1.40c, Chicago, and it is understood that this price cannot be brought out uniformly. For mill prices see Pittsburg report. Freight to Chicago 18 cents. We quote from local jobbers stocks as follows:

All angles, 3 inches and larger, including 6 inches, $1.60 per 100 pounds; angles over 6 inches, $1.70 per 100 pounds base; beams, 3 to 15 inches, inclusive, $1.60 per 100 pounds base; channels, 3 inches and larger, $1.60 per 100 pounds base.

Merchant Pipe and Boiler Tubes.—A continual improvement in the tonnage of merchant pipe is reported, particularly in the direction of building requirements. The demand for boiler tubing is still quiet and reports indicate that in the matter of price buyers in quantity are favored somewhat. Steel pipe prices are firm. We quote for lap-weld tubes out of store, 65 off, and for charcoal, 50 off. For mill discounts, see Pittsburg report.

Cast Iron Pipe.—The contract for 4,500 tons of pipe for the city of St. Louis was awarded to the United States Cast Iron Pipe & Foundry Co., which interest also took 350 tons at Fort Wayne, Ind., and a like amount at Toledo, O. The 2,800 for which bids were asked at Hugo, Okla., went to contractors. Prices are firm and we quote as follows:

Four-inch water pipe, $27.50; 6 to 14-inch, $26.50; larger sizes, $25.50; gas pipe, $1 a ton higher.

Wire Products.—The trade has not entirely adjusted itself to the new schedule announced last week, but the well maintained tonnage during the closing days of the spring trade indicates that the new prices are generally well received. It seems probable that advantage will be taken of these low prices and jobbers and dealers generally will greatly increase their stocks. As the stocks in all sections have been very low, a round tonnage will probably be required. The readjustment of differentials between the various forms of wire products has been a matter of interest, but as yet no special buying has resulted. We quote as follows for Chicago delivery:

Wire nails, jobbers' carload lots, $1.78; retailers' carload lots, $1.83c; retailers, less than carload lots, $1.93; painted barb wire, jobbers' carload lots, $1.78; retailers' carload lots, $1.83, with 30c for galvanizing; plain wire to jobbers in carloads, $1.58; staples, $1.78. Wire rods, Bessemer, $27; open-hearth, $28; chain rods, $27, f. o. b. Pittsburg.

Rails and Track Supplies.—The week brought out a very good tonnage of standard rails. Including the St. Paul order mentioned a week ago, about 105,000 tons were placed under contract, deliveries in each case to begin immediately. The Illinois Steel Co. took 15,000 tons for the Lake Shore & Michigan Southern, 15,000 tons for the Missouri, Kansas & Texas, 10,000 tons for the Missouri, Oklahoma & Gulf railroad, the contract being placed through the Wm. Kenefick Co., and 4,000 tons for the Santa Fe. The St. Paul order for 60,000 tons calls for Bessemer rails. The demand for light rails has improved somewhat, though the attitude of the trade with regard to the new schedules for light rails advancing prices from $3 to $4 a ton has not yet been brought out. We have revised our light rail prices. Specifications for track fastenings, especially bolts, were improved. Spike prices show signs of some weakness as indicated in our quotations. We quote as follows: Light rails, 40 and 45 pound, $26; 30 and 35-pound, $26.75; 16, 20 and 25-pound, $27; 12-pound, $28. In lots of 250 to 500 tons a reduction of 60 cents a ton from these prices is made; lots of 500 tons and up carry a reduction of $1 a ton. Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; spikes, 1.75c; track bolts, with square nuts, 2.15c to 2.20c; with hexagon nuts, 2.30c to 2.40c; small railroad and square boat spikes, 1.90c base, f. o. b. Chicago.

Old Material.—The scrap market is characterized by a marked activity on the part of the middlemen, but the leading consumers seem not especially urgent in their requirements. The market is firm, but, with some 10,000 tons of scrap about to enter this market as listed in the last few days by the railroads, there seems little probability of any sharp advance in prices. The consumers in this market are fairly well supplied. The railroads have obtained good prices for material offered, but the large buyers who were in the market last week obtained the greater portion of their purchases at the bottom of the market. Among the railroad lists reported are a Chicago, Milwaukee & St. Paul list for 1,300 tons, 6,000 tons by the B. & O. railroad, 1,100 tons by the Omaha branch of the Northwestern system and 500 tons by the Soo line. The Great Northern Ry. and the Michigan Central are also offering a limited tonnage. We quote gross tons in the first paragraph as follows:

Old car wheels	$14.50 to 15.00
Old iron rails	16.75 to 17.25
Rerolling rails (4 ft. and over)	14.75 to 15.25
Old steel rails (4 ft. and under)	14.25 to 14.75
Light section relayers, 45 lbs. and under subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	19.00 to 19.50
Frogs, switches and guards	13.00 to 13.50
Heavy melting steel	13.25 to 13.75

We quote, net tons, as follows:

No. 1 R. R. wrought	$12.75 to 13.25
No. 2 R. R. wrought	11.75 to 12.25
Knucklers, couplers and springs	12.25 to 12.75
Shafting	15.25 to 15.75
Iron car axles	17.50 to 18.00
Steel car axles	16.50 to 17.00
Dealers' forge No. 1	9.50 to 10.00
Pipes and flues	9.00 to 9.50
No. 1 cast, 150 lbs. and less	13.25 to 13.75
No. 1 mill	7.00 to 7.50
Mixed busheling (Nos. 1 and 2)	8.50 to 9.00
Country sheet	5.00 to 5.50
No. 1 boiler cut	9.00 to 9.50
Boiler punchings	12.00 to 12.50
Cast borings	5.50 to 6.00
Mixed borings, etc	5.50 to 6.00
Machine shop turnings	7.00 to 7.50
Railroad malleable	12.25 to 12.75
Agricultural malleable	10.75 to 11.25
Stove plate and light cast scrap	11.25 to 11.75
Old iron splice bars	14.50 to 15.00

CLEVELAND.

Ore Prices Fixed and Heavy Buying Begins—Violence in Lake Strike.

Office of THE IRON TRADE REVIEW,
Browning Building, May 11.

Iron Ore.—Last year's prices have been reaffirmed, and sales amounting to nearly two million tons have been made. We quote as follows: On base ores, with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer. Old range Bessemer, $4.50; Mesabi Bessemer, $4.25; old range non-Bessemer, $3.70; Mesabi non-Bessemer, $3.50. Ore shipments from upper lake ports for April amounted to 55,794 tons. No shipments were made in April, 1908. Shipments by ports for 1907 and 1908 were as follows:

Port—	April, 1907.	April, 1909.
Escanaba	291,823	47,123

Marquette	10,047	.....
Ashland	15,220	8,671
Superior	106,678	.....
Duluth	101,909	.....
Two Harbors	105,248	.....
Totals	630,975	55,794

The strike of the lake seamen and affiliated unions has continued, attended by considerable violence. At Superior, on May 8, the crew of the steamer Berlin was attacked by union sympathizers and one of the attacking party was shot dead during a fusilade, which lasted several minutes. Six others were injured, several seriously. The mob then fled, carrying away several wounded. The Berlin, manned by non-union men, pulled out into the stream to avoid further attack, and the trouble subsided. In other places, violence has been less pronounced, and no other fatalities are reported. In spite of the intimidation, vessel owners have been able to put new men on wherever the employes deserted, and the outlook is that it will be simply a matter of endurance between the unions and the Lake Carriers' Association, with the probabilities of victory strongly in favor of the association. The longshoremen may order a sympathy strike.

Pig Iron.—Although no important sales are reported, inquiry continues active, and numerous sales of small tonnages are being made. The tendency of prices is upward. In the valley, the $14 price seems to have entirely disappeared, and $14.50 is now the usual quotation, while some interests are asking $14.75. For the first quarter of next year, $15 valley has been asked. We quote delivered in Cleveland as follows:

No. 1 foundry	$15.70 to 15.75
No. 2 foundry	15.20 to 15.25
No. 3 foundry	14.70 to 14.75
No. 2 southern	15.35 to 15.85
Gray forge	14.00 to 14.50
Bessemer	15.65 to 15.90
Lake Superior charcoal	19.00 to 19.50
Jackson Co. 8 per cent silvery	20.05

Coke.—Cleveland Furnace Co. has contracted for last half requirements, 15,000 to 20,000 per month. The market seems to be firmer, following a tendency toward weakness a few days ago. We quote spot furnace coke $1.45 to $1.65 at the ovens, and on contract $1.70 to $1.75. First class Connellsville foundry coke we quote spot at $1.80 to $2, and on contract, $1.90 to $2.25.

Finished Materials.—The city council of Cleveland has passed an ordinance requiring that steel ties be used on all street railroad work, and the Carnegie Steel Co. has received an order for 2,000 ties from the receivers of the Cleveland traction companies. It is anticipated that when conditions in street railroad matters in Cleveland become more settled, there will be a heavy demand for steel ties. These ties, which weigh about 100 pounds each, have been laid on the Doan and St. Clair street lines, and have proved very satisfactory. On steel bars, 1.20c is now the lowest price and sellers are not making contracts except in very exceptional cases; hence, business is confined very largely to orders for prompt shipment. While some additional bar contracts have been made with implement concerns for the period ending July 1, 1910, at a premium of $1 for the period after Dec. 31, 1909, contracts are not being made with other consumers, except for the remainder of this year to large interests, and to Oct. 1 with other buyers. On shapes, the bottom price is now 1.30c and while that price is also being asked for plates by the leading interest, it can be shaded to about 1.25c. Very little contracting is being done in sheets. One large independent interest reports that its total business in April for all products was ten times that of April, 1908. Jobbers report a gratifying increase in orders, both from stock and mill.

Old Material.—Some sharp marking up of prices was the feature of the market the past week. Heavy steel was advanced $1.50 and other grades 50 cents to $1 each. This seems to be at present distinctively a "dealers' market." Holders are letting go of but small quantities of material, preferring evidently to keep it in their own yards, and at that, only small quantities of material are passing to mill owners, all of which combines to make the market not only perplexing to both buyer and seller, but leads to suspicion of an added element of uncertainty as to price maintenance for any length of time. We quote f. o. b. Cleveland as follows:

Old iron rails	$15.00 to 15.50
Old steel rails (re-rolling)	13.50 to 14.00
Old steel rails (under 6 feet)	13.50 to 14.00
Old car wheels	14.50 to 15.00
Old steel boiler plate	11.00 to 11.50
Malleable iron (railroad)	12.75 to 13.25
Steel axles	17.00 to 17.50
Malleable iron (agricultural)	11.50 to 12.00
Heavy steel	13.00 to 13.50
Country mixed steel	12.00 to 12.50
Low phosphorus	16.00 to 16.50

We quote net tons, as follows:

No. 1 R. R. wrought	$12.50 to 13.00
No. 1 busheling	10.50 to 11.00
No. 1 machine cast	12.50 to 13.00
Iron axles	17.00 to 17.50
Axle turnings	8.50 to 9.00
Machine shop turnings	7.00 to 7.50
Grate bars	10.50 to 11.00
Pipes and flues	10.00 to 10.50
Tank iron	9.00 to 9.50
Hoop and band iron	7.50 to 8.00
Sheet iron	6.50 to 7.00
Wrought drillings	7.00 to 7.50
Stove plate	10.50 to 11.00
Cast borings	6.00 to 6.50

Mattie stack of the Girard Iron Co., Girard, O., blew out April 27, but was to have blown in again May 10.

CINCINNATI.

Lessening of Activity in Pig Iron Market.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., May 11.

Pig Iron.—Inquiry in this territory is subsiding and the week has been less active in the pig iron market. A northern consumer bought 4,500 tons of valley Bessemer and few moderate tonnages have been sold comprising foundry iron and basic. A local consumer is in the market for 1,000 tons of analysis iron and an Illinois melter is asking for prices on about 4,000 tons for deliveries extending over the last half of this year and the first half of next year. In southern Ohio the market has become firmer for the last half and $14.50 Ironton furnace for that delivery is now fairly well established. Southern iron for the last half is held at $11.50 Birmingham. There is practically no call for prompt shipment for May and June delivery and southern iron for this period is obtainable at $11 Birmingham. The price of northern iron is not well established as to the balance of the second quarter and while it is believed in the trade that $14 can be done for prompt shipment there is no inquiry or sales on which to determine the market. The Hamilton Iron & Steel Co. furnace at Hamilton, O., went out of blast last Saturday. Some southern producers have advanced their asking prices for the last half and two important interests are holding for $12 Birmingham for fourth quarter delivery. Melters are still inclined to hold up shipments on contracts which is increasing the supply of prompt iron both in the north and south, and the spot iron market is weaker than for forward delivery. It is not clear that the advance in the price has been entirely responsible for the lessening of the demand and inquiry for last half, as so many of the consumers have covered that practically all of those who seriously intended to cover at this time have probably covered their wants. It seems to be a question of consumption now as to the future of the market. We quote for prompt delivery and for May and June delivered Cincinnati based on freight rates of $3.25 from Birmingham and $1.20 from Ironton as follows:

Southern foundry No. 1	$14.75 to 15.25
Southern foundry No. 2	14.25 to 14.75
Southern foundry No. 3	13.75 to 14.25
Southern foundry No. 4	13.25 to 13.75
Southern No. 1 soft	14.75 to 15.25
Southern No. 2 soft	14.25 to 14.75
Southern gray forge	13.25 to 13.50
Northern No. 1 foundry	15.70 to 16.20
Northern No. 2 foundry	15.20 to 15.70

Northern No. 3 foundry	14.70 to 15.20
Jackson county 6 per cent silicon	18.70
Jackson county 8 per cent silicon	19.70
Jackson county 10 per cent silicon	20.70

Finished Material.—The market appears to be in stronger shape this week. Prices are still a little irregular, although sales have been made at full schedules. Specifications on contracts are good and this is encouraging to the producers. Some of the large mills have put steel bars on the $1.20 basis and claim to be making sales at the advance.

Coke.—The market remains unchanged. Calls for coke on contracts are keeping up fairly well. There is some contracting for foundry coke for forward delivery. Furnace coke is quiet. Spot coke can be had at the inside prices given below, while for forward delivery higher prices are asked which are represented by the outside quotations in this table of prices. Quotations are f. o. b. ovens.

	Per Ton.
Wise county furnace coke	$1.60 to 1.85
Wise county foundry coke	2.00 to 2.25
Pocahontas furnace coke	1.65 to 1.85
Pocahontas foundry coke	1.85 to 2.25
Standard Connellsville furnace coke	1.60 to 2.00
Standard Connellsville foundry coke	1.90 to 2.40

Old Material.—There is some interest in the market and a steadier feeling prevails. Dealers are inclined to hold a little firmer. We quote dealers' prices to the trade as follows:

Old No. 1 R. R. wrought net tons	13.00 to 13.50
No. 1 machinery, net tons	13.00 to 13.50
Old iron rails, gross tons	15.50 to 16.50
Old steel rails (re-rolling) gross tons	14.00 to 14.50
Old short lengths, gross tons	13.50 to 14.00
Old iron axles, net tons	16.50 to 17.00
Heavy melting scrap, gross tons	12.00 to 12.50
Stove plate, net tons	11.00 to 11.50
Heavy turnings	7.50 to 8.00
Cast borings, net tons	5.50 to 6.50
Car wheels, gross tons	13.50 to 14.50

PHILADELPHIA.

Basic Pig Iron Sold and Quotations May be Advanced.

May 11.

Pig Iron.—The sale of a considerable tonnage of basic has featured the market of the past week. Several mills in this vicinity having reached the conclusion that the bottom had been reached, and basic producers being willing to book a moderate tonnage on a $15, delivered, basis, several good lots were closed for delivery running well into the third quarter, though in no case was later shipment provided for. Some additional tonnage is pending at this figure, which will probably be advanced in the early future. Aside from basic, the chief activity of the week has been in foundry, of which a number of 1,000-ton lots have been closed. Railroad shops and equipment manufacturers, jobbing foundries, pipe works, machine tool makers and others have been in the market, which is losing nothing of the strength manifested for the last few weeks. Prices are stiffening, with here and there specific advances, and sales are being made for more extended deliveries, usually for the third quarter, and occasionally through the year. One pipe interest in this territory is asking tenders on 5,000 tons of Nos. 3, 4 and forge iron for June-August shipment, and other pipe works are in the market. There is also some call for mottled iron, and a little low phosphorus business for a local consumer is pending. While the situation is stronger and prices are tending upward, the principal effect of the buying movement so far has been to eliminate the weak spots, and quotations as given below, for early delivery at eastern Pennsylvania plants, are not noticeably higher:

No. 1X foundry	$16.25 to 16.75
No. 2X foundry	15.75 to 16.25
No. 2 plain	15.25 to 15.75
Standard gray forge	15.00 to 15.25
Basic	15.00
Low phosphorus	19.00 to 20.00
No. 2 Birmingham	15.75 to 16.25
No. 2X Virginia	16.50 to 17.00
No. 2 plain Virginia	16.00 to 16.50

Finished Materials.—Interest centers in the Philadelphia & Reading grade crossing requirements, about 17,000 tons of steel, on which bids went in today. The general contract for the Real Estate Trust addition, involving 1,000 tons, has gone to Doyle & Co., and the steel will probably be supplied by the American Bridge Co. The Bellevue-Stratford addition, for which 2,000 tons will be required, has gone over definitely until next spring, but an early decision is anticipated on 2,000 tons for the Chestnut Street Realty Co., which is a Girard interest, and the general contract for which has gone to the Fuller Co. The Elks' building at Baltimore has gone to the Baltimore Bridge Co., which has not yet placed the 1,000 tons of steel required.

Plain materials are fairly brisk, and the recently advanced prices seem to be holding well. One lot of 1,000 tons of shapes is among the sales reported and inquiries are current for 3,000 tons of billets. A fair volume of ship yard business is coming out. Bar iron makers are securing few orders, but have advanced prices. We quote: Structural shapes, 1.45c to 1.50c; plates, 1.45c to 1.50c; sheets, No. 28, 2.80c; steel bars, 1.35c to 1.40c; refined bar iron, 1.35c to 1.45c.

Old Materials.—The market has suddenly taken on a revival of strength, principally because of the entrance of two or three large melters of heavy steel, who are offering $14.50 and $15 without securing any attractive tonnages. Other lines have shown a corresponding advance, though no business of importance has been done. Normal lists put out by the Pennsylvania, Baltimore & Ohio, Lackawanna, Reading, Lehigh and Central railroads closed yesterday and today. The following quotations in most instances represent offerings by consumers in this section for delivered product:

Old steel rails (rerolling)	$15.50 to 16.00
No. 1 steel scrap	14.75 to 15.25
Old steel axles	18.00 to 18.50
Old iron axles	19.50 to 20.00
Old iron rails	17.50 to 18.00
Old car wheels	15.00 to 15.50
Choice scrap R. R. No. 1 wrought	17.00 to 17.50
No. 1 yard scrap	15.00 to 15.50
Machinery scrap	14.50 to 15.00
Low phosphorus scrap	19.00 to 19.50
Wrought iron pipe	14.25 to 14.75
No. 1 forge fire scrap	12.50 to 13.00
No. 2 forge fire scrap, ordinary	8.50 to 9.00
Wrought turnings	11.00 to 11.50
Axle turnings, heavy	11.75 to 12.25
Cast borings	9.50 to 10.00
Stove plates	12.00 to 12.50

NEW YORK.

Many Structural Contracts Taken by Independent Interests.

Office of THE IRON TRADE REVIEW, Room 1005, No. 90 West St., May 11.

Iron Ore.—Two furnace interests in Eastern Pennsylvania within the past 10 days have purchased over 100,000 tons of the Swedish ore, of which a trial cargo was received some time ago. This ore has a very high iron content and is low in phosphorus and silicon, which renders it desirable for mixing purposes. Miners of Spanish ores have been chartering heavily of late for American service. A number of lake operators have been through this district recently but no selling of importance seems to have resulted.

Pig Iron.—The buying movement continues, and throughout this district a very fair tonnage has been placed during the last week. The leading pump manufacturer has bought heavily for its various plants and has secured rather extended deliveries. Prices as yet have not advanced generally, but the soft spots are being eliminated rapidly and here and there a furnace is advancing its quotations 25 or 50 cents. On standard iron it is unlikely that $15.00 furnace, can be shaded for 2X, fairly prompt delivery, and $15.50 is the ruling figure on later shipments. In the New England field practically no No. 2 iron can be had at $16.50, delivered, and a fair run of business is being booked at $16.75 to $17.00. Several basic sales are reported, and the aggregate tonnage placed has been fairly large. This business apparently has been taken at $15.00 delivered, but is all for shipment over the next

few months. Two or three large blocks are still under negotiation, including one of 20,000 tons. There has also been some selling of Virginia product, though the majority of producers in that district are holding at a price which puts them out of competition. Pipe works are in the market for several good lots, which will probably be closed at about $15.00, delivered. We quote, early delivery at New York tidewater, as follows:

Northern foundry No. 1	$16.25 to 16.75
No. 2X foundry	15.75 to 16.25
No. 2 plain	15.25 to 15.75
No. 2 southern foundry	15.00 to 15.50
Malleable	16.25 to 16.75
Basic	15.25 to 15.50
Gray forge	15.00 to 15.25

Ferro-Alloys.—The market abroad has taken on considerable strength, ferro-manganese recording a sharp advance on Friday. Locally the situation is no stronger, but the outlook is for early improvement. Sales aggregating a few hundred tons have been made in the East at rather low prices, and one fair sized lot in the Chicago district has been closed at a price equivalent to $41.00, Baltimore. Ferro-silicon is stronger, prompt metal being scarce and the current quotation is $62.00 to $63.00, Pittsburg.

Finished Materials.—The feature of the week has been the heavy bookings by independent interests, in which connection it is reported that prices have been as low as at any time since the depression started. There is reason to believe, however, that early improvement can be looked for in this direction and that fabricating concerns will follow the example of the mills in getting their prices back on at least a cost basis. The Hay Foundry & Iron Works have been successful in securing several important contracts of late, among them the Kipp building at Irving Place and Sixteenth street, requiring 1,300 tons, the Lorillard tobacco warehouse near this city, 5,500 tons, and the Seaboard Realty building on Fourth avenue, 4,500 tons. It is understood that on all of these propositions Bethlehem sections are specified, as is the case with a 700-ton building in Kansas City, taken by the Kansas City Structural Co. The Hinkle Iron Co. will supply the 2,000 tons of steel for the Wolf building on West Twenty-sixth street, the Belmont Iron Works has secured the Second Avenue car barns, 1,400 tons, the Cambria Steel Co. will supply 5,000 tons for the Inter Ocean Steel Co. plant in the Chicago district, and 1,400 tons for the Pittsburg Athletic Club, and the Minneapolis Steel & Machinery Co. has taken the Anaconda penstocks at Great Falls, Mont., about 2,500 tons. The general contract has been let by the Boston Wharf & Terminal Co. for a large wool warehouse, but the steel, about 8,000 tons, has not yet been bought. Jones & Laughlin steel will be supplied for the Horn store building at Pittsburg, 3,000 tons, the Crown Iron Works have a 500-ton hotel at Duluth, and the T. H. Symington foundry at Corning, N. Y., reported a week ago as having gone to an independent fabricator, has been awarded to the American Bridge Co., which was not the low bidder; some 2,000 tons of steel are involved. In railroad business the Pennsylvania Steel Co. and the Phoenix Iron Works have divided a 900-ton letting by the Seaboard Air Line; the Rock Island has withdrawn its inquiry for 1,700 tons; the St. Paul has placed 800 tons with the Wisconsin Bridge Co. and an equal tonnage with the American Bridge Co.; the Boston & Maine has awarded 700 tons to the New England Structural Co.; the Baltimore & Ohio has placed some 400 tons, about half with the Pennsylvania Steel Co., and the latter company has also taken 700 tons for the Erie Hackensack draw bridge, the approach for which, requiring about the same tonnage, is reported as having gone to the Lackawanna Steel Co. A good volume of frog and switch business is coming out, and the Pennsylvania Steel Co. has secured a large angle bar order from the New Haven. The P. & L. E. is in the market for 1,000 tons of steel, and the Riter-Conley Construction Co. has secured 900 tons for track elevation work of the Erie at Buffalo. The American Bridge Co. has taken 200 tons for a Lackawanna bridge. The largest new project to develop in this territory is the Cooper-Hewitt block front building on Fourth avenue near Twenty-eighth street, for which 4,000 tons will be required.

Of interest to the Eastern steel trade is the formal announcement of the Pennsylvania Steel Co. that plans have been drawn for an open-hearth plant at Sparrows Point (Maryland Steel Co.) and that construction work will be begun immediately and will be rushed. The rail market presents no feature other than that the Harriman inquiry for 40,000 tons is being figured on. Bids are sought on both open-hearth and Bessemer, and stringent specifications are provided.

Plain materials are in fair demand, but there is still some price shading on early delivery material. On the other hand, instances are coming to light where larger producers are suffering old customers to take their tonnages elsewhere rather than shade the level to which prices were advanced late in the week. We quote:

Angles, 3 to 6 inches x ¼-inch and heavier, 1.46c; beams, 3 to 15 inches, 1.46c; tees, 3 x ¼-inch and heavier, 1.51c; plates, carloads, tank, 1.46c; marine boiler, 1.86c; bar iron, 1.35c to 1.40c; soft steel bars, 1.36c; sheets, No. 28 black, 2.56c.

Cast Iron Pipe.—No important sales are noted in this territory, though considerable business is in prospect. Quincy, Mass., is in the market for 480 tons, ranging from 4 to 12-inch. The Lynchburg Foundry Co. was low bidder on 500 tons for the Canal Commission.

Old Materials.—The market has taken on a stronger tone and prices are higher throughout the list, not because of more active buying, but because the mills are evidencing keen interest in the situation. There has been some selling of heavy melting steel at $15 and $15.50, eastern Pennsylvania plants, but even these prices are not bringing out any large tonnages. Rolling mills are still buying sparingly. We quote, gross tons, New York tidewater delivery, as follows:

Old steel rails (rerolling)	$13.50 to 14.50
Relaying rails	19.00 to 19.50
Old car wheels	12.50 to 13.00
Old iron car axles	16.50 to 17.00
Old steel car axles	14.50 to 15.00
Heavy melting steel	12.00 to 12.50
No. 1 railroad wrought	15.00 to 17.50
Iron track scrap	12.50 to 13.00
Wrought pipe	11.00 to 11.50
Cast borings	6.00 to 6.50
Wrought turnings	7.00 to 7.50
Heavy cast scrap	12.50 to 13.00
Railroad malleable	11.00 to 11.50
Stove plate	9.50 to 10.00
Grate bars	9.50 to 10.00

BUFFALO.

Activity in Pig Iron Held as Cause for Encouragement.

Office of THE IRON TRADE REVIEW,
932 Ellicott Square, May 11.

Pig Iron.—The market is in a much healthier condition with a stronger tendency toward specific hardening prices. It is found necessary to alter quotations at this point and while lower figures are given this week they are nearer actual closing prices than it has been possible to quote for many weeks, but they must still be regarded as approximate to a marked degree as the amount of tonnage desired by the consumer, the grade of iron and the time of delivery have much influence on the transactions. The activity in the local market is decidedly encouraging. The tone is better everywhere in this district except where there are interests dependent upon the railroads. These have not shown the increased strength expected. Closings are now for larger tonnage and the small business continues to progress. Heavier business is running in 2,000 and 3,000-ton orders. Most business is for early delivery during

June, July and August. Forward delivery orders are becoming more numerous and prices on same are somewhat higher than those quoted. Foundries in Buffalo, while improving in output, have not shown the increased activity lately which has been noted in other New York state cities, such as Syracuse, Albany, Utica and Troy. Rochester is dull but Schenectady is more active. Inquiry shows that most of the heavy tonnage being moved, goes to manufacturers of special machinery and agricultural implement manufacturers. Jobbing foundries are active, although in western New York the gain in business has not been rapid and many interests are operating considerably below normal. We quote f. o. b. Buffalo as fololws:

No. 1X foundry	$15.00 to 15.50
No. 2X foundry	14.50 to 15.00
No. 2 plain	14.25 to 14.75
No. 3X foundry	14.00 to 14.50
Malleable Bessemer	16.50 to 17.00
Gray forge	14.00 to 14.50
Charcoal	19.25 to 20.25

Finished Products.—The letting in finished material lines has not been heavy but plain business has shown a stronger tone and definite orders include larger tonnage. The contract for fabricated structural on the McCarthy building, 400 tons, was awarded to Charles F. Ernst, of Buffalo. The Buffalo Structural Steel Co. will furnish material for the St. John building. The largest closing of the week was at Pottsdam, N. Y., when the American Bridge Co. will supply 700 tons of structural for the Rackett River Paper Co. building.

ST. LOUIS.

Sale of Basic Pig Iron—Many Small Orders for Foundry Grades.

May 10.

Pig Iron.—One order for 10,000 tons of basic iron is reliably reported to have been placed in the St. Louis territory last week, one inquiry is out for 3,000 tons of southern iron, another for from 750 to 1,000 tons of southern iron—all for delivery over the remainder of the year—and the placing of numerous small orders of from 50 to 400 tons kept the market active. The market is firm at $11.50 Birmingham, for No. 2 for prompt delivery, and the same price can be done for delivery over the next two or three months, but an advance of 50 cents is asked for deliveries in the last few months of 1909. Some furnaces are out of the market for all deliveries, and while they have not sold up their estimated production for the year, they expect higher prices later and feel justified in waiting. The melters are taking in iron satisfactorily and some of them are requiring shipments to be anticipated. Our quotations, delivered, to which the freight of $3.75 from Birmingham has been added, follow:

No. 1 southern	$15.75 to 16.25
No. 2 southern	15.25 to 15.75
No. 3 southern	14.75 to 15.25
No. 4 southern	14.25 to 14.75

Coke.—The coke market is firm, with some of the ovens asking higher prices than were quoted last week, especially for extended deliveries. Inquiries were fairly numerous, covering both immediate and future shipments, some of them extending through the first half of 1910. The best-selected Connellsville 72-hour foundry coke is quoted at $1.90 to $2.25, ovens, for prompt shipment, while $2.15 to $2.25 is asked for deliveries over the second half of the year. The ovens are backward about quoting prices for the first half of next year. Some little business has been placed in the last week for the first half delivery as low as $2.25. The best-selected Connellsville 48-hour furnace coke is held at $1.50 to $1.75 ovens, for prompt shipment, while high-sulphur coke is bringing $1.30 to $1.40. The prices of Virginia and West Virginia grades have not changed since last quotations. The freight rate to East St. Louis and St. Louis is $2.80 and $2.70 from the Virginia fields when the shipment is consigned beyond St. Louis.

Old Material.—The quotations on scrap iron in this territory remain as follows:

Cast iron borings, free from foreign material, net tons	$ 5.00 to 5.50
Steel axle turnings, gross tons	10.00 to 11.00
Steel railroad axles, net tons	16.50 to 17.00
Iron railroad axles, net tons	17.50 to 18.50
Miscellaneous steel scrap, gross tons	9.00 to 11.00
Old car wheels, gross tons	14.50
No. 1 railroad cast scrap, net tons	12.00 to 12.50
Heavy machinery cast, net tons	11.50 to 12.50
Stove plate and light cast, net tons	10.00 to 11.00
Sheet iron, net tons, uncut	4.00 to 5.00
No. 1 railroad wrought, net tons	12.00 to 13.00
Railroad malleable, net tons	12.00 to 12.50
Heavy melting steel, net tons	11.00 to 12.00
Relaying rails, net tons	16.00 to 17.50

BIRMINGHAM, ALA.

Steady Inquiry Continues and Prospects are Favorable.

May 10.

A continued steady line of inquiry, a few sales being made and bright prospects keep the southern pig iron manufacturers in good humor. The make is to be materially improved during this month and it is expected that the banner month's output is to be obtained in this state as compared to the production for the past two years. One furnace went out of blast during the month of April that was overlooked, hence the reduction of nearly 5,000 tons shown in Alabama's output.

Quotations are still strengthening. Several furnace companies are quoting $12 per ton, No. 2 foundry, with $11.50 being the price offered by others. The greater portion of iron already sold in this district is to be delivered before the fourth quarter of the year starts in. It is estimated that between 400,000 and 500,000 tons of iron has been sold since the middle of March, the Tennessee Coal, Iron & Railroad Co. having sold one-half of that amount. The Republic Steel & Iron Co. has also sold a large quantity, while the Sloss-Sheffield Steel & Iron Co. has been trailing along in the iron selling line.

Very little talk is being heard in the Birmingham district over the shut-down of the steel plant of the Tennessee Coal, Iron & Railroad Co., at Ensley. Quite a number of men are being given employment in the improvement and structural work that is going on about the plant, in fact there are not so many men thrown out of employment as was at first anticipated. The blowing in of the two Bessemer, Ala., furnaces and the preparations to blow in two more, possibly before the end of the month, have had a most encouraging effect.

More orders are being secured by the cast iron pipe manufacturers in the Birmingham district and trainload shipments promise to be of frequent occurrence shortly. St. Louis and other large cities have been giving out some business recently to the pipe makers in the southern trritory. Deliveries are being made on the San Francisco, Seattle and other heavy western orders by the manufacturers in this section.

Old material is quoted as follows:

Old iron rails	$13.00 to 14.00
Old iron axles	13.00 to 14.00
Old steel axles	12.00 to 12.50
Old steel rails	9.00 to 9.50
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	10.00 to 11.00
No. 1 country	8.00 to 8.50
Heavy melting steel	8.50 to 7.50
Old steel boiler plate	7.00 to 7.50
No. 1 machinery	10.00 to 11.00
Old standard car wheels	12.00 to 12.50
Stove plate	8.50 to 9.00
Cast iron borings	4.00 to 4.50

METAL MARKETS.

NEW YORK.

May 11.

Copper.—The April report of the Copper Producers Association, made public yesterday, places the production during the previous month at

113,574,292 pounds, or about 4,000,000 less than the production reported in March. On the other hand, deliveries practically equalled the production, being 112,656,121 pounds or about 4,500,000 pounds more than in March. Surplus stocks now aggregate 183,198,073 pounds. The report was considered so favorable that quotations were at once advanced and the market was further strengthened by reports of very heavy selling on Saturday. We quote, Lake, 13⅛c to 13⅜c; electrolytic, 12¾c to 13c; casting, 12⅝c to 12⅞c.

Pig Tin.—The London market has strengthened and this has brought about a corresponding improvement in the local market, although business is still very limited and the situation is by no means vigorous. Current selling is on the basis of 29⅜c to 29¾c.

Pig Lead.—After a rather inactive week, the market has taken on renewed strength and some business is now being done on the basis of 4.25c to 4.30c, New York. The market is decidedly more firm.

Spelter.—There is no change from a week ago, the New York price remaining at 5.02½c to 5.07½c. Moderate business is reported.

Antimony.—Cookson's is quoted at 8¾c to 8½c, Hallett's at 8⅛c to 8⅜c and ordinary brands at 7⅞c to 8⅛c.

CHICAGO.

May 11.

Carload lot purchases of copper in this market indicate no appreciable advance though the market undoubtedly shows upward tendencies. Smaller sales have brought higher prices. Spelter is somewhat weaker but lead is bringing higher prices. We quote as follows:

Lake copper, carload lots, 13¼c to 13½c; casting, carload lots, 13c to 13¼c; pig tin, 31c to 31½c; spelter, 5.20c to 5.35c; pig lead, desilverized, 4.40c to 4.50c in 50-ton lots; corroding, 4.75c to 4.80c in 50-ton lots; car lots, 2½c per 100 pounds higher; sheet zinc, 6¾c list f. o. b. LaSalle in car lots of 600-pound flasks; Cookson's antimony, 10½c to 11c; other grades, 10c.

Interest in old metals is more active and the market is stronger with generally higher prices prevailing particularly in copper and brass. We have revised our prices and quote as follows:

Copper wire, 11½c; heavy copper, 11¼c; light copper, 10½c; heavy red brass 10½c; heavy yellow brass, 8½c; light brass, 6¼c; No. 1 red brass borings, 8¾c; No. 1 yellow brass borings, 7¾c; brass clippings, 8¼c; tea lead, 3½c; lead scrap, 3.85c; zinc, 3.25c; tin pipe, 24½c; tin foil, 23c; pewter, 17½c; electrotype plates, free from wood, 3.80c; electrotype dross, 2.65c; stereotype plates, 4⅛; stereotype dross, 3.75c; prime slab zinc dross, $46 per ton.

ST. LOUIS.

May 10.

Lead and Zinc.—The price of zinc ore dropped to $40 a ton in the Missouri-Kansas-Oklahoma district last week from one of $41 for 60 per cent ore of the preceding week. There was a slight manifestation of strength in the lead ore market A slump of from $5 to $4.90 in St. Louis spelter was partly assigned as the cause of the decline of $1 in zinc quotations. The highest price paid for this ore last week was $43 on an assay basis of 60 per cent. Heavy buying on the part of the smelters also caused the demand to be lighter. The strong bidding at the close of the week was taken as an indication that the present week would see a market active and at somewhat better prices.

The highest price reported to have been paid for lead ore was $58 a ton, but the majority of sales were made at $55 and $55.50. The best figure reported in the Joplin camp was $53.50 a ton. Pig lead was quoted at $4.20 a ton in St. Louis at the close of the week.

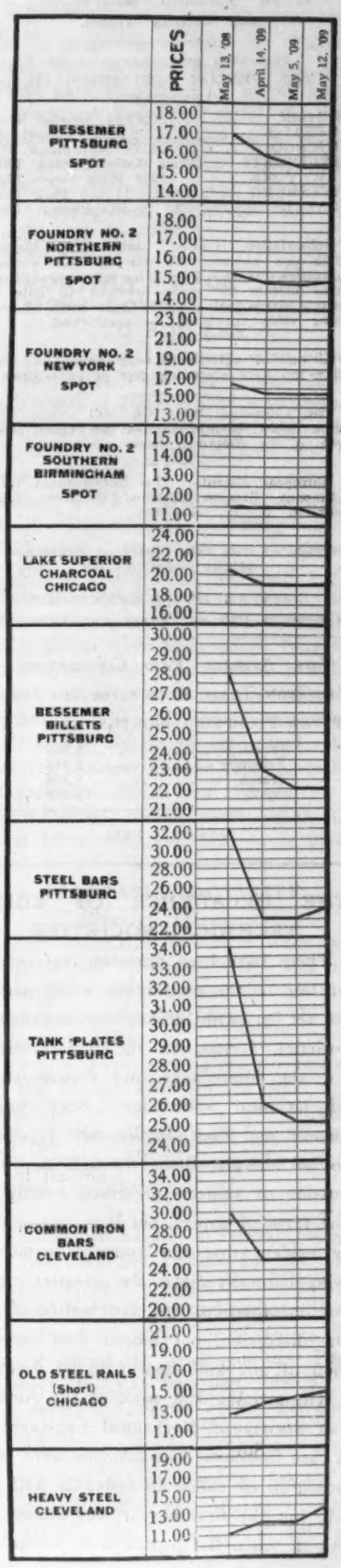
Calamine ranged from $17 to $20 a ton on a 40 per cent basis.

TEXAS ORE PURCHASE.

St. Louis, Mo., May 12.—The Jefferson Iron Co., a syndicate composed of St. Louis capitalists, has purchased the property of the Lone Star Iron Co., at Jefferson, Tex., and is making arrangements to extend its holdings in that state. The officers of the new company are: A. P. DeCamp, president; N. P. Withington, secretary-treasurer; W. F. McClurg, vice president. It is believed that when the plans of the new company are completed it will be found to possess one of the very best iron ore deposits in the southwest.

The Wm. J. Smith Co., New Haven, Conn., has appointed the well known engineering firm of Vickers, Sons & Maxim, Ltd., 32 Victoria street, London, S. W., Eng., as sole agent for the sale of one-lock adjustable reamers, in Great Britain, France, Belgium, Germany and Austria.

PRICE CHART.



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February	5,346
March	5,396
April	5,508

May 13, 1909.

THE DECADENCE OF SOME TECHNICAL SOCIETIES.

There have been numerous references of late to the ossification which seems to set in with certain old-established societies, formed in the first instance for the interchange and dissemination of technical knowledge. Such interchange and dissemination are supposed to be brought about through the discussion of subjects presented usually in the form of papers, but it is increasingly evident that the younger members, who naturally have the greatest need for information, are not welcomed in the discussion, nor indeed does discussion of any kind appear to be desired.

The meeting last week of the American Society of Mechanical Engineers is a case in point. The sessions were supposed to be called to order at 9:15 A. M., but the first day it was almost 11 A. M. when the papers were taken up. Announcement was made that in order to carry out the entertainment program for the afternoon, beginning at 1 o'clock, it was essential that members and guests should be on hand on time, which necessitated adjournment of the professional session before noon, and in this time five papers were dealt with.

The second and third days were repetitions of the first. Worthy papers which would have provoked discussion were hurried through in order to miss nothing of the entertainment features, and those disposed to discussion were discouraged by the reiterated warning from the chair to "cut it short." There were not six hours of work done during the entire meeting. If the society expects to make its deliberations of any real value, it will have to adopt a different line of action. Professional men of ability will not prepare papers which are to be treated in so slighting a manner. It would be better many times over to postpone the reading of the later papers to a subsequent meeting rather than choke off discussion in order to gallop through them for the purpose of getting them into the transactions. To be sure, there are papers which are not worth discussing, nor yet printing; that is not entirely preventable, but there were papers presented at Washington that would have been discussed freely, had the chair not so insistently advised the members to hasten. We are very much mistaken if the dissatisfaction which has been freely expressed does not make itself felt unmistakably later on. The "commercialism" to which the chair referred will have the floor entirely to itself; if not, the A. S. M. E. will pass into history.

In striking contrast with the Washington meeting was that of the younger organization, the American Electro-Chemical Society. At the latter convention there was a large amount of able discussion of valuable papers and the professional sessions covered the most of each day. Another organization which always does good work at its meetings is the American Society for Testing Materials. Both of these societies are fortunate in having able and wise presidents and secretaries.

SIGNIFICANCE OF A SUCCESSFUL CONVENTION.

In number and enthusiasm of those in attendance and in interest and technical value of the papers read, the fifteenth general meeting of the American Electro-Chemical Society at Niagara Falls last week was one of the most successful ever held by this energetic young association.

The results fully justified the management in devoting a whole day to the electro-metallurgy of iron and steel, as was evident by the number and importance of the papers presented and by the large attendance of men practically engaged in the iron and steel industries. Papers of great interest were received from each of the inventors of the electric iron furnaces and processes that have come into commercial use, as well as from several eminent engineers who have been associated with their designing and operation. These papers collectively give an accurate idea of the present status of the application of electricity to the metallurgy of steel and what its prospective advance is to be. To one who has not kept in immediate touch with the recent results attained with the electric steel furnace, the record of its wide adoption reported at this meeting is marvelous. When it is stated that the electric steel melting furnace has been largely adopted in so conservative a locality as Sheffield, Eng., we may well consider its status as past the first experimental stage.

While our great coal and coke centers will undoubtedly long continue to produce the larger part of the world's pig iron and to refine it into steel, it was clearly shown at this meeting that certain favored localities will soon be producing material quantities of iron; that the use of electricity for melting the finer grades of tool and alloy steels is now the best and cheapest way; and that the electric furnace will soon be generally used for specially refining many grades of steel after they leave the present open-hearth or Bessemer processes. There is no doubt that ample funds will be provided in the near

future to cary out one of the suggestions made at the meeting, namely, to secure much greater economy by the installation of very large furnaces with larger electric currents and correspondingly smaller losses.

As iron ore and fuel increase in value, the tendency to use better and better grades of steel will increase, since the life of these is greater and the cost of the special refining necessary to produce them is decreasing. Wherever steel must stand specially severe service, the best steel obtainable is usually the cheapest, since the cost of labor, and especially of time incidental to frequent renewals is eliminated. Thus, many parts of railway lines demand the best possible wearing steel, and where maximum strength in cables and other steel is necessary, the extra cost of the greatest possible refining of the steel to be used is often the cheapest plan. Then, too, the use of fine steels for special purposes is increasing rapidly of late, especially for automobiles and fine machines of many kinds.

For all these reasons the new power for producing exceptionally refined steel, which is now possible in the use of the electric furnace, is destined to have a large use and this in the not distant future, and the enthusiasm shown by members and guests at the recent Niagara meeting for the electrometallurgy of iron and steel is not without good foundation. On the whole, the management of the Electro-Chemical Society is to be congratulated on bringing together so interesting and valuable a set of papers and on the entire success of their program.

POWER CONTRACT

Arranged in Worcester, Mass., for Heroult Furnace Now Building.

Worcester, Mass., May 8.—Of the two big electric furnaces to be installed by the United States Steel Corporation, one is to be located at the south works of the American Steel & Wire Co., in this city. The electricity to operate the plant is coming into Worcester over the wires of the Connecticut River Power & Transmission Co., arrangements having been completed for this end.

In speaking of the matter, Clinton S. Marshall, district manager for the wire company, said:

"Had we not been able to complete this arrangement it would have meant the decline of our local plant, which now produces the highest quality of steel, and now with this new furnace will continue to do so. Had not the wire company arranged with the transmission company for electric service it meant either a power plant would have to be put in at the south works, or else the furnace would be located in the west. A power plant for this furnace alone would be too expensive to be considered, as to maintenance."

The furnace is of the Heroult type, 15 tons capacity, which is much the largest yet built, the average size being three to eight tons. The new furnace, which will be ready for business in two to three months, it is expected, will produce about 35,000 tons or more of steel per annum, all of which will be manufactured into wire for various purposes.

PIG IRON SPECIFICATIONS CONSIDERED BY PHILADELPHIA FOUNDRYMEN.

A paper describing the Fery radiation pyrometer, prepared by Charles E. Foster of the Taylor Instrument Companies, Rochester, N. Y., and read by H. Y. Norwood, was the feature of the Philadelphia Foundrymen's Association's regular meeting, held at the Manufacturers' club on the evening of May 5. This paper was practically the same as that prepared by Mr. Foster for the May number of *The Foundry*. The pyrometer is unique in that it does not require direct contact with the hot metal or the furnace, but will register the heat from a distance. As chairman of the pig iron specifications committee, Walter Wood presented a revised report incorporating the suggestions offered by the members since the presentation of the original report at a meeting some months ago. The report was explained at some length by Mr. Wood and was made the subject of general discussion. This report, together with that of the pig iron committee appointed by the American Society for Testing Materials, will be presented at the Cincinnati convention of the American Foundrymen's Association; its recommendations apply only to foundry iron. President Thomas Devlin was elected to represent the association at the Cincinnati gathering.

BELLAIRE PLANT

Will Soon Resume—Six Millions for Coke Ovens at Gary, Ind.

(Special Telegram.)

New York, May 12.—The Carnegie Co. is preparing to start the Bellaire plant, two furnaces and a steel mill. These have been down 17 months.

Work has been started on the construction of 560 by-product ovens for the United States Steel Corporation plant at Gary, Ind. The Corporation has appropriated $6,000,000 for the building of these ovens.

BI-MONTHLY WAGE SETTLEMENT LOWERS RETURNS TO BOILERS.

The regular bi-monthly examination of the sales sheets of representative companies at Pittsburg, May 10 showed that the iron mill wage schedules for the months of May and June will be based upon a 1.30c bar iron card as against a 1.35c card for March and April. This means a puddling rate of $5.25 a ton during these months against $5.37½ in March and April and a decline of practically one per cent in the iron finishing rate. As sheet and tin plate prices have been below base for months, the wage rate in these products will continue at base for the next two months. The May-June settlement will be the last to be made under the present scales of the Amalgamated Association as a new agreement is expected to be in force when the next bi-monthly examination is made.

INCREASED ACTIVITY.

(Special Telegram.)

Pittsburg, May 12.—Last week was a period of special activity with the Carnegie Steel Co., and its finishing capacity is now operating at 70 per cent of normal.

Orders have been given to resume at the Bellaire plant of the Steel Corporation in two weeks. One blast furnace, the steel works, blooming mill and one finishing mill will be placed in operation.

Instead of having individual outings as has been the custom for the past several years, the employes of Mackintosh, Hemphill & Co. and Seaman-Sleeth Co., Pittsburg, have joined forces for a big outing at Rock Springs Park, Chester, W. Va., Saturday June 5. A big series of athletic events has been scheduled.

The Canonsburg Iron & Steel Co., Canonsburg, Pa., has offered to start up its idle plant if employes will accept a 10 per cent wage reduction.

NEW SHEET MILLS

Placed in Operation by National Sheet Steel Co. at Mansfield, O.

The National Sheet Steel Co., Mansfield, O., placed its plant in operation for the first time March 29, for the manufacture of open-hearth and iron sheets and the mills prove to be running very successfully. So far the plant includes three finishing mills, one roughing mill and two stands of cold mills with foundations for two additional mills. The company is also erecting a galvanizing department.

The National company's products will consist in the main of electrical sheets, blued and polished, being manufactured under the patents granted to W. M. Blecker. Other high grade sheets will also be manufactured, the capacity of the plant being estimated at 1,200 tons a month. The officers of the company are: President and treasurer, W. M. Blecker, of Canton, O.; directors, Elmer E. Mack, cashier of the George D. Harter bank, of Canton, O.; Myron Green and Samuel Luntz, of the Canton Iron & Metal Co., of Canton, O.; William A. Neal, of Neal Bros., Pittsburg, and G. A. Lindoerfer, of Cleveland, O. The former superintendent, G. A. Miller, has been relieved and his holdings have been purchased by Mr. Blecker.

VULCAN DETINNING REPORT.

The report of the Vulcan Detinning Co. for the year ending March 31, 1909, shows an increase in net profits for the twelve month closed of $111,467. In comparison with the previous year these figures are shown:

	1908.	Increase.
Net profit	$182,619	$111,467
Dividends	56,250	.....
Surplus	126,369	111,467
Previous surplus	389,374	15,582
Total surplus	515,743	127,049

President Samuel R. Beardsley, in his report, ascribes the increase in net profits mainly to the extensions and improvements made during the year in the detinning plants, and the greater amount of business accomplished thereby. Also to the operation of the iron foundry plant purchased in June, 1908, from the Empire Iron & Metal Co. at Sewaren, N. J., where part of the scrap product of the detinning plant is converted into sash weights and like products. In concluding, President Beardsley said:

The foundry plant was destroyed by fire on March 30 of this year, the loss being fully covered by insurance. It is now being rebuilt. The detinning plant at Sewaren, N. J., was closed during the month of January, 1909, and the Streator plant during two weeks of the same month, for the purpose of making the annual repairs and various changes. During the rest of the year both plants continued running full time both day and night. The present uncertainty about the tariff, especially with regard to steel schedules, interferes to some extent with the free marketing of our scrap product. The prompt settlement of this question is most desirable. With this one exception the condition of our business and its prospects for the present fiscal year are most favorable.

MANUFACTURE HEAVY PUMPS IN COMBINATION.

The Allentown Rolling Mills, Allentown, Pa., has completed an arrangement whereby large orders for its line of electric and power pumps, hydraulic and filter presses, will be filled by the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa. The Birdsboro company has completely equipped steel and iron foundries and is in position to turn out all kinds of open-hearth steel castings, gray, charcoal, air furnace and chilling irons. The machine shop is well adapted for large work and special equipment is being installed for the manufacture of electric pumps in the most improved manner. It is the intention of the Allentown Rolling Mills to manufacture at Allentown all the pumps under 40,000 pounds and at Birdsboro all those exceeding this weight. In order to simplify the general correspondence, the company has selected the title of the "Aldrich Pump Department" which will perform the office of designing and selling the various articles manufactured by the several companies. In their general operations however, both companies will remain independent of each other.

WAGE REPORT THURSDAY.

(Special Telegram.)

Detroit, Mich., May 11.—The report of the wage committee of the Amalgamated Association of Iron, Tin and Steel Workers is expected to be presented to the convention Thursday of this week. The various committees are busy so far preparing reports on wages, constitution, good of the order as well as the insurance feature. The attendance at the executive sessions averages 125. It is authoritatively stated that the life of the convention may extend possibly beyond the 10 days originally decided upon. The mayors of Columbus, O., and Fort Wayne, Ind., have extended invitations to the delegates to hold the next annual convention at their respective cities.

One Lucy stack of the Carnegie Steel Co. was blown out April 20. One South Sharon, Pa., stack of the Carnegie Steel Co. was lighted April 3.

THE VIRGINIA PIG IRON ASSOCIATION.

R. L. Parrish and W. W. Taylor, of the Oriskany Ore & Iron Corporation which operates the Buena Vista and Iron Gate furnaces, entertained the Virginia Pig Iron Association at the Homestead Hotel, Hot Springs, Va., on Saturday, May 8.

It was the regular monthly meeting of the association, but was devoted largely to social enjoyment. After a sumptuous luncheon, the guests were taken for a beautiful drive to other springs and were delightfully entertained en route by Mr. Gunton and wife at their picturesque mountain home.

The recent improvement in the demand for iron and the prospects for early buying on the part of railroads, together with other conditions, imparted an optimistic spirit to the Virginia iron producers.

Starting Active Work.—W. C. Franz, general manager, and W. K. Whigham, a director of the Lake Superior Corporation of Sault Ste. Marie, who were in Toronto recently, have gone to Sudbury with a view to starting active work on the Manitoulin & North Shore railway, one of the company's enterprises. It will extend from the smelter, 13 miles west of Sudbury, to the nickel properties further west and thence south to Little Current, 72 miles in all. A large staff of engineers and surveyors is on the ground and the work will be vigorously pushed. Messrs. Franz and Whigham report favorable conditions at Sault Ste. Marie, the steel plant having been in continuous operation for several months. An immediate expenditure of $1,000,000 will be made in adding an extra furnace to the open-hearth plant and installing an additional blast furnace so as to increase the output of pig iron.

The owners and holders of stock of the Birmingham Coal & Iron Co., the Atlantic & Birmingham Construction Co., and the Atlanta, Birmingham & Atlantic Railroad Co. and other closely affiliated interests, have requested Edward S. Marston, Frederick Ayer, Samuel Carr and John I. Waterbury to act as a reorganizing committee. The committee has drawn and filed a protective agreement, under which steps will be taken to protect the interests of the creditors of above referred to, as well as prepare a plan of reorganization, which will be submitted soon.

GERMAN IRON MARKET.

Better Tone, but Normal Conditions Do Not Yet Prevail.

Duesseldorf, April 21.—There is decidedly a better tone in the market now, after buyers have seen that prices have touched the bottom and that further reductions cannot be expected. In some lines of the trade, especially in pig iron, there is not yet a direct improvement, but consumers take the quantities bought far more quickly than they did some weeks ago. In half-finished and finished material, much more business is going now, although the quantity handled does not by far equal that of previous years. The prices of all products are unchanged, but producers are firmer and refuse reductions. One thing is certain: viz., that we have gotten over the lowest point, although we are still very far from normal conditions.

The annual reports of our big industrial concerns all show very considerable decreases and for the most part are rather worse than one had expected. The reports known so far are mostly of coal and coke concerns, which felt the bad times less than the iron and steel works, because the coal-syndicate kept the prices high. July 1 will show the consequences of the bad times better, as far as iron and steel are concerned. The big mixed works are now profiting through the cheapness of money to make preparations for a war in prices, which may break out in 1912, when the Stahlwerksverband will come to an end. It is almost certain that this syndicate will not be renewed in 1912, as the interests of the different members have become too divergent.

Money is very cheap and favorably influencing the building business. The troubles in the Near-East have lost their bad influence because a satisfactory agreement has been made between Austria and Servia.

BRITISH IRON MARKETS.

Less Buying of Pig Iron, but Prices are Firm.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., May 1.

Another week has passed without the slightest sign of reaction in the pig-iron industry. Although there is less buying, prices are still firm, the falling off in purchases being due merely to the fact that, for the time being, urgent needs have been supplied. There is evident a widespread belief that trade is on the eve of a revival. The complete figures of shipments during April show exports from Middlesbrough of 110,865 tons. Germany is again becoming a large customer for pig iron. This state of affairs, it will be remembered, was an important feature in the last trade boom, the shipments to Germany then exceeding all previous records. So far there are no purchases from America calling for special mention. Buyers are more anxious than sellers now for forward delivery and contracts are being arranged for the third quarter of the year for No. 3 Cleveland on the basis of 48s 6d ($11.88).

PERSONALS.

Chas. M. Schwab sailed for Europe May 4.

Walter L. Clark, vice president of the Niles-Bement-Pond Co., is again in Europe.

Joshua A. Hatfield, president of the American Bridge Co., of New York, was a passenger Tuesday on the Kaiser Wilhelm II and will spend about two months in Europe.

George D. Evans, for a number of years connected with the Cleveland sales office of the Republic Iron & Steel Co., will hereafter be connected with the Denver office of the Carnegie Steel Co.

John P. Quier, for a number of years assistant superintendent of blast furnaces at the Bethlehem Steel Co.'s works, has accepted a similar position with the New York State Steel Co., Buffalo, N. Y.

Wm. G. Holmes, who has been connected with the American Car & Ship Hardware Co., of New Castle, Pa., has resigned to accept the position as general manager of the Akron Brass & Bronze Foundry Co., Akron, O.

J. E. Orr has resigned as superintendent of the blast furnace of the Carnegie Steel Co., at South Sharon, Pa., and has been succeeded by A. L. Cromlish, assistant superintendent at the Sharon and South Sharon furnaces.

John D. Morgan, member of the New York patent bar whose series of articles on patent subjects recently appeared in THE IRON TRADE REVIEW, has removed his offices to Room 1022, No. 2 Rector street.

OBITUARIES.

Germain M. Cossitt, pioneer agricultural implement manufacturer of Brockville, Ont., died April 27, aged 87. With his brother he went to Canada in 1849 from New York state, where he engaged in business.

Henry D. Smith, formerly at the head of an iron foundry at Appleton, Wis., died at his home there April 26. He operated the first electric lighting plant in the country for the purpose of selling electricity for commercial purposes.

William E. Miller, who was formerly president of the Shelby Tube Co., and later formed the Elyria Iron & Steel Co., died at his home in Elyria, O., April 27, of heart failure. He was born in Constableville, Lewis county, N. Y., Aug. 22, 1839. When 18 years old he entered the hardware store at Cleveland now operated by the W. Bingham Co. After several years spent in New York state, he returned to Ohio, and became identified with the Grafton stone quarry, which in 1899 was absorbed by the Cleveland Stone Co. Then he became identified with the Shelby Tube Co. and sold his holdings to the United States Steel Corporation. His son, W. Stacy Miller, is president of the Elyria Iron & Steel Co.

Francis X. Pund, vice-president of the D. T. Williams Valve Co., of Cincinnati, died at his home in that city, May 8. Mr. Pund was born in Cincinnati and educated at St. Xavier's College in that city. He entered the hardware business and was connected with the Walter F. Ludlow Hardware Co. and the Perin Graff Hardware Co. From 1884 to 1890 he was connected with the old firm of Post & Co. In 1890 he formed a partnership with George Puchta under the name of the Puchta-Pund Co. Later this became the Queen City Supply Co. and Mr. Pund was vice president. In 1905 he severed his connection with the latter company to become vice president of the D. T. Williams Valve Co. He was 58 years of age and is survived by his widow, a son, Francis X. Pund Jr., who is in the Cincinnati sales office of the Republic Iron & Steel Co., and two daughters.

Lafayette Crowley, superintendent and director of the Detroit Stove Works, died May 10 at his summer home in Atlantic City. He had been ill for two years, after having been stricken with apoplexy. He was born in Cincinnati, Aug. 16, 1846, and served his apprenticeship in the foundry of Chamberlin & Co., Cincinnati, continuing with that company 18 years. In 1879 he went to St. Louis, and served one year as general superintendent of the plant of Giles F. Filley. In 1888 he removed to Detroit as assistant superintendent of the Detroit Stove Works, and was appointed general superintendent in 1882, and became a member of the board of directors in 1888. He was very popular, not only with his business associates, but with all his employes. A daughter, Mrs. E. T. Barbour, is also a member of the board of directors of the Detroit company. The body has been removed to Detroit, and the funeral services were held Thursday afternoon from the residence, 192 McDougal avenue.

JOINT SESSION

Of Southern and American Supply and Machinery Dealers' Associations.

Chattanooga, Tenn., May 10.—The joint session of the Southern Supply and Machinery Dealers' Asssociation and the American Supply and Machinery Manufacturers' Association was held at the Hotel Patten, in this city, from May 5 to 7, and was attended by nearly 500 delegates and a large number of ladies and visitors. The convention was said to be the most successful ever held by the associations.

The first session was on Wednesday morning at 10 o'clock, and from that time until late Friday night, every moment of the visitors' time was either occupied by business or pleasure. The social feature of the convention was a banquet on Thursday night at which Governor M. R. Patterson, of Tennessee, was the principal speaker. A luncheon for the ladies at the Golf and Country club, a smoker and vaudeville at the hotel, a boat ride on the Tennessee river, auto trips to Chickamauga Park and Lookout mountain were among other interesting features.

Early Wednesday morning, the first meeting of the Southern Supply and Machinery Dealers' Association was held. This was presided over by J. C. Huntington, of Huntington, W. Va. This meeting was held behind closed doors, and only executive business was transacted.

In the afternoon, the opening of the joint conventions was held with President Miller presiding. Mayor W. R. Crabtree, of Chattanooga, delivered the address of welcome. This address was responded to by President Miller, of the Southern Association.

The Banquet.

The banquet at the Hotel Patten on Thursday evening was presided over by Edward C. Hinman, of Battle Creek, who had a witty introduction for each speaker. The banquet was attended by almost 400 persons, many of whom were ladies.

Governor Patterson was the principal speaker of the evening. He discussed local issues, the general prosperity of the country and the relation between the southern and northern manufacturer. He did not go into special features, but spoke in a general way.

Another speaker was H. Clay Evans, of this city, former pension commissioner and more recently minister to London. He discussed the south from a historical standpoint. W. L. Frierson and A. W. Chambliss, both former mayors of this city, responded briefly to toasts. "The Ladies" was the subject of a toast responded to in a most eloquent manner by C. F. Aaron, president of the American association. George W. Taite, of Cleveland, spoke on the subject of "Boosting." M. W. Mix, former president of the American association, spoke on "Lessons in Poker." His remarks were largely humorous.

Papers Read.

The business features of the convention were carried out with but few changes in the regular program. The following papers were read: "Practical Plans for Putting into Operation and Establishing a Proper Re-Sale Policy," E. H. Hartfelder, Savannah, Ga., Hartfelder-Garbutt Co., Southern Supply and Machinery Dealers' Association, and Willard Parker, Spring City, Pa., Shafting Co., American Supply and Machinery Manufacturers' Association; "Necessary Steps to Secure Co-operation of Manufacturers Who Are Outside of the American Supply and Machinery Manufacturers' Association," F. A. Hall, New York City, Yale & Towne Mfg. Co.; "Necessary Steps to Secure Co-operation of Dealers Who are Outside of the Southern Supply and Machinery Dealers' Association," J. A. Reichman, Reichman-Crosby Co., Memphis, Tenn.; "How Can Traveling Salesmen be Boosters for Association Work?" Geo. W. Taite, Cleveland, Sawyer Belting Co.; "The Duty of the Jobber to Give Effective Representation to the Manufacturer," W. H. Banks, Banks Supply Co., Huntington, W. Va.

Election of Officers.

The election of officers of the Southern association was held Friday. H. C. Clark, of Birmingham, president of the Charlotte Supply Co., was elected president for the ensuing year.

Other officers elected were as follows: E. H. Hartfelder, of Savannah, first vice president; Walter E. Mills, of Chattanooga, second vice president; Alvin M. Smith, of Richmond, Va., secretary and treasurer.

J. C. Mills, of Huntington, W. Va., was chosen secretary of the executive committee. Following are the other members: J. C. Fischesser, Montgomery; J. C. Doyle, Nashville; Joseph B. Simmons, New Orleans.

Of the manufacturers' and conference committee, W. H. Banks, of Huntington, W. Va., was re-elected chairman, while the following members were chosen: John D. Westbrook, Norfolk; W. P. Simpson, New Orleans.

The place of meeting for the 1911 convention was not selected.

The election of officers for the National association will be held at Pittsburg this week when the annual convention is held in that city.

DECREASED PRODUCTION

But Better Outlook in the Connellsville Coke Region.

A slight decrease in production but a better tone in the general coke market is reported by Secretary Geo. B. Irvin, of the Coke Producers' Association, in his review of conditions for the week ending May 4, which is as follows:

Production of coke last week declined somewhat by reason of the ovens belonging to the furnace interests and those of the open market concerns averaging less than five days' work for the week. A slight decrease in the percentage of active ovens occurred, that of last week being 58.4 per cent as compared with 58.6 per cent of the week preceding. Shipments were 130 cars more last week to Pittsburg and points west than during the previous week. Sixty-two ovens were put out at the Martin works of the Woodside Coke Co., and 49 at the Edna plant of the Waltersburg Coke Co. The Struthers Coal & Coke Co. closed its plant at Fairbank on Friday and Saturday of last week, as did the Rocks Coal & Coke Co., at its Cyrilla plant. On the other hand, the Thompson Connellsville fired 120 ovens and the Tower Hill Connellsville Coke Co. increased the number of active ovens to 185. No changes occurred at the Rainey plants and as far as could be learned none at the Frick Coke Co.'s works. Each operated five days during the week.

Despite the slight decrease in active ovens, the outlook for an improvement is brighter than for several months. Inquiries are more numerous and the foundry trade is reported much better. From all over the country the reports to the various trade journals indicate that not only is there a greater demand for iron and steel products, but better prices are being demanded and obtained and, considering the light demand and sales during the past five months, some comparatively large sales are reported.

Coke operators generally expect a decided improvement in the coke business within the next 60 days.

In the Pittsburg district, 48 of the 01 furnaces are now in blast, one stack being added last week to the Bessemer group, making nine of the 11 furnaces in that group now active.

Working Under Receiver.—Operations are being continued by the J. B. & J. M. Cornell Iron Works under the receivership of Michael Blake and A. Gordon Murray, their activities being chiefly centered on getting out work already contracted for, though some new contracting is being done. The creditors' committee, which was in charge of the company affairs before the receivership, is now working with the receivers in an effort to bring about a reorganization.

AMONG MACHINERY MAKERS.

MILWAUKEE.

Adding Employes and Lengthening Hours is Becoming the Rule.

Milwaukee, Wis., May 10.—Returning prosperity seems to be experienced by many of the machinery manufacturing concerns of Milwaukee. While the improvement is taking place slowly, orders are increasing in volume and business is taking on a brighter outlook. Manufacturers in several cases report an increase in the output and the enlargement of working forces.

"Our output is increasing and the prospects for the future are bright," said First Vice President L. F. Bower, of the Allis-Chalmers Co. "To cope with the increasing business we are putting on new men and lengthening the working hours. Within the last two months we have enlarged our force by several hundred men."

The Wisconsin Bridge & Iron Co., of Milwaukee, has received an order from the Wisconsin Central railroad for 600 tons of structural steel for bridge construction. Several other large orders have been received by the Milwaukee concern of late, all indicating an improvement in the general field.

The B. F. Freeland Sons Co., of Sturgis, Mich., manufacturers of steel tanks, will locate at Portage, Wis., where manufacturing operations will be under way by July 15.

The Racine-Sattley Co., well known machinery builder of Racine, Wis., has started its trimming shop on an 11-hour schedule. Several of the departments of the plant are now running 12 hours daily, due to the increase in orders.

The cause and prevention of iron rust in everything from locomotives and farm machinery to structural steel is being studied in the chemical engineering department laboratories of the University of Wisconsin. Several hundred alloys of iron have been examined in the belief that some will be discovered which will not rust. Work is being carried on under a Carnegie grant and is under the charge of Prof. Charles F. Burgess, head of the chemical engineering department.

Two exceptionally large steel bridge contracts were awarded in Wisconsin the past week. The city of Sheboygan accepted the bid of the Milwaukee Bridge Co., of Milwaukee, for constructing a steel, one-leaf bascule type, bridge over Sheboygan river at Pennsylvania avenue, at $83,240. An appropriation of $90,000 had been made for the bridge and the result of the competitive bidding is extremely gratifying to the purchasers.

The Chicago & Northwestern Railroad Co. awarded the contracts for building three double-track bridges in the vicinity of Neenah, Wis., to Adolph Green of Green Bay, Wis. One bridge, across Little Lake Buttes des Morts, will be nearly one mile long and the other two, both across Fox river, will be nearly a half mile long each. The cost is about $1,250,000.

INDIANAPOLIS.

Manufacturers Report Nearer Approach to Normal Conditions.

Indianapolis, May 10.—Machinery and iron manufacturing concerns of the state are now nearer a normal business basis than at any time since the panic some 18 months ago. Some local machinery manufacturing companies are working full time with satisfactory orders ahead. The local fabricating plants have large orders in all parts of the country, as well as several large orders here.

The Atlas Engine Works has begun the manufacture of automobile gasoline engines on an extensive scale and is also making several hundred motor buggies. An order for 800 two-cylinder engines and steel chassis has been received from the Anderson Carriage Mfg. Co., of Anderson.

Concrete molding machinery is to be manufactured by the Dexter Mfg. Co., of South Bend, which was organized recently with an authorized capitalization of $10,000. Directors of the company are Fred C. Klein, Walter H. Baker and George W. Zinky, all of that city.

The Noelke-Richards Iron Works is busy with an order for 615 tons of structural steel to be used in the new city hall building here. It will be erected by the Westlake Construction Co., general contractor for the city hall building, and will be delivered within 90 days.

James H. Moore, E. J. Feeney and S. R. Blanchard have organized the Tandem Pumping Appliance Co., at Marion, with an authorized capitalization of $27,000. The concern will manufacture pumps and pumping appliances.

The plant of the American Car & Foundry Co., at Jeffersonville, resumed operations last week after a year's idleness. About 400 men have been put to work and it is expected that the plant will be operated steadily from now on. Passenger cars and equipment will be worked on during the remainder of the summer, it is understood.

NEW YORK.

Present Business Dull, but Heavy Buying Expected Later.

Office of THE IRON TRADE REVIEW, Room 1005, No. 90 West St., May 11.

The machine tool trade of this district continues without important developments. For the past two weeks, there has been somewhat less activity than during the period immediately preceding it, and current sales are still relatively small, but the outlook seems to be growing steadily brighter because of the fact that a considerable number of factory buildings, foundries, and other industrial plants are planned for construction during the summer months. The general idea seems to be that with the coming of the fall season business activities should approach the normal and efforts of the larger manufacturing concerns are seemingly directed at a leisurely preparation for such a revival.

No large lots of tools have been sold in this district of late and no important lists have come out. It is anticipated, however, that there will be heavy buying by the New York Central lines sometime during the summer, as President Brown has announced the authorization of expenditures aggregating about $13,200,000 for general improvement and equipment purposes. Of this about $5,500,000 will be spent by the Lake Shore & Michigan Southern in building the four-track of its system west of Buffalo, in purchasing freight equipment and improving the Chicago yards. Railroad earnings continue to show gratifying increases, as may be judged from the experience of the New York Central system, which during April handled the greatest number of loaded cars in its history, with one exception, for some months.

Two foundry propositions in New York state are now being watched by the trade. The General Electric Co. has placed contracts for a large iron foundry structure at its Schenectady plant. Contracts have also been let for the Corning, N. Y., plant of the T. H. Symington Co., which will be a very large proposition. The latter is in charge of Geo. K. Hooper, New York City, as consulting engineer.

Dodge & Day, engineers of Phila-

delphia, Pa., are at work on plans and specifications for the new plant of the Emerson Steam Pump Co., to be built at Alexandria, Va. This will cost in the neighborhood of $50,000.

The Southwalk Mfg. Co., Philadelphia, has purchased from Wm. H. Griffiths, the factory buildings at the corner of Swansen and Mifflin streets, the consideration being given as $42,000.

Considerable activity prevails among the brass manufacturing concerns of Connecticut. The Cheshire Brass Co., West Cheshire, Conn., is to erect a small plant to replace that recently destroyed by fire. The Oakville Co., of Oakville, Conn., has let contracts for a large addition to its plant, and the A. H. Wells Co., Waterbury, Conn., is also to have an additional factory building. It is stated that the American Tube & Conduit Co., which sometime ago was noted as having established a large brass plant at Hastings-on-the-Hudson, New York, is to manufacture rolled products as well as tube and wire.

CINCINNATI.

Slight Improvement in Machine Tool Business.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., May 11.

The first week in May has found the machine tool business in this center slightly improved. More orders have been received here this week than in the preceding one, which gives the manufacturers renewed hope that the month may be more satisfactory than April. Among the encouraging signs is the revival of interest in the list of the D., L. & W. Ry., and it is hoped that this order will be placed in the near future. It has been pending for a long time, but it is believed now that the purchase will be made. Automobile manufacturers continue to be conspicuous as customers for machine tools, and the activity of this branch of industry has helped materially in furnishing orders for our plants. An occasional foreign order is received, but there is no material improvement in the demand from this quarter. Some good shipments of second-hand engine equipment have been made recently, but the general run of the business in second-hand machines is quiet. There has been practically no change in the running time or quota of men employed in the shops.

P. G. March, president of the Cincinnati Shaper Co., has returned from a two months' trip abroad. Mr. March has made a careful study of the conditions in the machine tool trade in Germany, England, France and Italy.

The Norton Machinery Co. has taken several nice orders recently for second-hand power equipment and has made two large shipments this week.

The Cincinnati-Bickford Co. reports a good week for both upright and radial drills and has some good inquiries.

The Lodge & Shipley Machine Tool Co. has received more lathe orders the past week than any week in April.

The Cincinnati Lathe & Tool Co. received several satisfactory orders the first week in May, none of which were for automobile makers, and this concern believes that inquiries are becoming more general.

PITTSBURG.

Present Regarded as Favorable Time for Making Contracts.

Office of THE IRON TRADE REVIEW,
510 Park Bldg., May 11.

The increasing signs of returning activity in finished iron and steel are giving a greater impetus to tentative plans of enlarged capacities and of new plants and definite steps are being taken in a number of cases. It is generally recognized that present conditions make it a favorable time for closing contracts for buildings and equipment, as prices are at advantageous levels for the purchaser. Sheet mill enlargements have been especially numerous, while pipe mills have been active in arranging to increase their outputs and several new tin plate mill projects have been placed on an assured basis. Estimating work is quite heavy although a considerable portion of this may never materialize.

The greater activity in mill operations is producing a better demand for rolls which are going largely to replacements. Considerable pump business is moving.

An important development in the local machinery situation is the action of the Jones & Laughlin Steel Co. in ordering contracts to proceed in connection with the construction of the extensive plant at Aliquippa, Pa. Comparatively little of the steel works and finishing mill equipment has yet been placed, but some has been let, including the blooming mill and heavy duty engines. The four blast furnaces are well out of the way as far as construction contracts go, as they are partially completed. The 30-mill tin plate plant projected as previously stated, as one of the finishing mills for the general works, is now receiving the attention of rolling machinery makers.

F. Felkel, 413 Fourth avenue, Pittsburg, industrial engineer, has designed a 25-ton open-hearth furnace for the Erie Forge Co., Erie, Pa., which is now nearing completion. The construction work was done by W. S. McKenna. The design contains many novel features and is said to combine very advanced thoughts in open-hearth furnace construction. Mr. Felkel has been the chief engineer in charge of the design and construction of the new iron mills of the A. M. Byers Co., Pittsburg, at Girard, O., which were recently completed.

F. P. Robinson, who has been associated with the N. C. Davison Co., Keenan building, Pittsburg, merchant engineer, has severad his connection with that company and is now with the Chapman-Robinson Co., Stevenson building annex, Pittsburg, engineer and manufacturers' representative. Mr. Robinson continues to handle the Aldrich line of power pumps. The N. C. Davison Co. will devote its attention to gas engines, refrigerating machinery and other equipment.

The borough of Avonmore, Pa., is installing a new public water works and has been awarding contracts for the machinery and for the general construction. The main equipment will consist of an Aldrich power pump with a capacity of 1,000,000 gallons per day which will be driven by a 100-horse power gas engine.

It is expected that contracts for some of the principal mechancal equipment for the new tin mill plant to be erected at Hollidays Cove, W. Va., by the Phillips Sheet & Tin Plate Co., will be awarded the coming week. Estimates have been obtained from rolling machinery makers on eight hot and 12 cold mills.

The Pittsburg Motor Truck Co. has taken out a Delaware charter with a capitalization of $100,000, and will engage in the manufacture of delivery trucks. A plant at Ithaca, N. Y., will be moved to Koppel, Pa., where the company has acquired a manufacturing site. New buildings will be erected and the mechanical equipment considerably increased. The main building will be 50 x 150 feet, two stories, with a foundry 40 x 80 feet and auxiliary buildings. The incorporators of the company are C. Carl Conkle, Pittsburg, P. C. Benedict, Salamanca, N. Y., and Martin E. Smith, Wilmington, Del.

The Thomas Steel Co., Niles, O., is planning the doubling of its sheet making capacity and other extensive improvements to its plant. During the week the contract was placed with the United Engineering & Foundry Co.,

Pittsburg, for five additional sheet mills of standard size, which when installed will increase the capacity of the plant to 10 mills. A new steel building is to be erected for the mills to be equipped with a traveling crane and other auxiliary machinery. It is expected that the improvements will be completed by fall.

The Hebb Coke Drawer Co. with offices at 421 Frick building, Pittsburg, has closed a deal with the Pennsylvania Engineering Co., New Castle, Pa., whereby the latter secures an interest in the Hebb coke drawer and will shortly begin the manufacture of the machine on a large scale. This transaction follows the successful use of the Hebb coke drawing machine by the Jones & Laughlin Steel Co. at its Second avenue plant, Pittsburg. Some improvements have lately been added to it, so that it is now possible to perfectly clean the ovens with the drawer. Under its new arrangement, the company is ready to begin the general manufacture of the machine and already has a number of orders waiting to be filled. The officers of the Hebb Coke Drawer Co. are L. L. Hiller, Pittsburg, president, and A. P. Austin, Uniontown, Pa., secretary and treasurer.

Make Heavy Castings.—The Wheeling Mold & Foundry Co. has decided to engage in the manufacture of heavy steel castings and is about to install a 20-ton open-hearth furnace at its plant at Wheeling, W. Va. The company will manufacture rolls, mill and other heavy castings in steel which it has formerly been furnishing in iron. The open-hearth furnace and other steel foundry equipment will be installed in the present buildings and no additional building will be necessary.

Portsmouth Steel Changes.—W. L. Glessner has resigned as president of the Portsmouth Steel Co., Portsmouth, O., and has been succeeded by Alex. Glass, who will serve as president and general manager of the company. T. H. Jones, formerly with the Wheeling Corrugating Co., has succeeded Donald Drennan as secretary of the Portsmouth Steel Co. Mr. Glessner still retains his interests in the Whitaker-Glessner Co., of which he is vice president.

The plant of the Passaic Steel Co., which was offered for sale some weeks ago and failed to secure a bid at the upset price of $700,000, will be offered again May 28, at the office of the company in Paterson, N. J. The upset price has been reduced to $150,000.

SWANK'S ANNUAL REPORT.

The annual statistical report of the American Iron and Steel Association for 1908, which has just been issued, appears earlier than usual this year. In addition to a large amount of statistical information, of which the most important parts have been republished by THE IRON TRADE REVIEW, the report contains a fine half-tone engraving of Joseph Wharton, the late honored president of the American Iron and Steel Association, and a tribute to his memory by his friend, James M. Swank, general manager of the association. In a letter to the vice president of the association, William Metcalf, Mr. Swank says:

Since the appearance of our last annual report on July 12, 1908, the work of this office has been continued on lines that are well established and well understood by our members. The historical and statistical work of the office, which are interwoven, and the defense of our protective policy have received constant attention; the commercial side of the iron trade is never considered. That is left to other agencies and should never be a feature of the work of this association. The limiting of production, the fixing of prices and wages, and other matters of a purely commercial character have no place in an office that is devoted to the collection of historical and statistical information relating to the greatest of all our manufacturing industries. It is becoming increasingly difficult to collect from year to year the statistics of the production of iron and steel in our country.

EASTERN BRANCH OPENED.

The largest warehouses in the country handling supplies for boiler makers and iron workers are located in Chicago. As a result many inquiries and orders received by them are from eastern territory. So large has become this demand that the Scully Steel & Iron Co., Chicago, recently opened a large new warehouse at Jersey City, N. J., where a full stock will be carried, particularly boiler braces, boiler flanges, pressed steel boiler lugs, pressed steel crabs, staybolts, patchbolts, staybolt taps, blow-off valves, tube expanders of all kinds, flue cutters, flue cleaners, hose couplings and small tools of all kinds.

This new branch will permit of serving the eastern trade from a point of advantage and immediate shipments can be made from a stock which will be continually replenished from the Chicago warehouses of this company.

Welcome to Cleveland.—The national headquarters of the National Metal Trades Association, having been removed from Cincinnati to Cleveland, the Cleveland branch of the National Metal Trades Association will tender a testimonial dinner of welcome in honor of President Howard P. Eells and Commissioner Robert Wuest, Saturday evening, May 15, at the Hollenden. The committee on arrangements consists of W. D. Sayle, H. W. Avery and C. J. Snow.

Plans Developing.—Promoters of the proposed consolidation of the independent coke plants of the Connellsville regions, report that their plans are developing very favorably and that the indications point to a successful outcome of their efforts to place all the principal properties under option. At a meeting of the independent interests at Uniontown, Pa., May 5, at which there was a very large representation of the various companies, the provisions of the general optional agreement were discussed. These options are stipulated to be given not later than Oct. 1, 1909, and a number of them are already in the hands of Charles McKnight and John W. Boileau, of Pittsburg, and others who are engineering the proposed merger. The Rainey interests were not represented at the Uniontown meeting and it is not likely that this company will be a party to the transaction.

Increasing Its Plant.—The Marion Steam Shovel Co., Marion, O., is building a large general office in which it will install the several officials of the company heretofore scattered through different offices. The engineering department will occupy the second story. Further additions are being made to the foundry. A new open-hearth steel foundry has just been placed in operation and is proving very satisfactory. A new pattern storage room is nearly completed. Plans have been prepared for additions to the machine shop and pattern making department as well as still further additions to the foundry and machinery departments. Contracts are still to be let on portions of the new construction work.

Vanadium Steels.—The American Vanadium Co., Frick building, Pittsburg, is issuing a new booklet on the various uses of vanadium steels and the publication covers practically everything that has been done in the introduction of this alloy to all forms of iron and steel. The booklet may be had by the trade upon application to the company's Pittsburg office.

The Virginia Iron, Coal & Coke Co. has resumed work at its coke ovens at Georgel, Va.

PENNSYLVANIA STEEL COMPANY REFLECTS DEPRESSION OF PAST YEAR.

The annual report of the Pennsylvania Steel Co. of New Jersey, which has just been submitted by President E. C. Felton and Chairman E. B. Morris, shows a decrease compared with last year in net earnings over operations for all companies of $1,651,314. The report covers the operation of the various mining, manufacturing and railroad companies controlled by the Pennsylvania Steel Co., for the fiscal year ending Dec. 31, 1908, and for the Pennsylvania Steel Co. for the fiscal year ending April 30, 1909. This comment is offered upon the general iron and steel situation as it presented itself on May 1, 1909, the day when the report was issued: "The business outlook is not encouraging. The demand for the products of your subsidiary companies is small, and the prices obtainable are lower than have prevailed in the steel trade for many years." The following comparisons are made of the combined income accounts for all companies for the year:

	1908.	1907.
Net from operations	$2,510,005	$4,161,319
Other income	204,614	314,395
Total income	2,714,619	4,475.714
Less bond interest	937,028	827,297
Net income	1,777,590	3,648,417
Less depreciation	516,736	1,267,327
Net profits	1,260,854	2,381,090
Surplus	105,853	1,226,089

Reviewing the manufacturing year, the report points out that the works of the Pennsylvania Steel Co. at Steelton and Lebanon, Pa., and of the Maryland Steel Co., at Sparrows Point, Md., produced in 1908 a total of 384,000 tons of pig iron and 450,000 tons of steel ingots, compared with 843,000 tons of pig iron and 932,000 tons of steel ingots in 1907. Their total invoices amounted to $19,432,000 in 1908, compared with $33,885,000 in 1907. No immediate additions or changes were made in its manufacturing plants during the year, but advantage was taken of the opportunity to place them in good repair. Respecting the coal properties owned by the company, the report says:

The coal properties owned by your subsidiary companies produced in 1908, 590,000 tons of coal compared with 428,000 tons in 1907. No new mine openings were made during the year, but the previously existing openings were developed and extended.

It will be remembered that the coal properties controlled by you were owned by two companies, the Penn-Mary Coal Co. and the Possum Glory Coal & Coke Co., in the latter of which your company owned a two-thirds interest. During the early part of 1909, the remaining one-third interest was purchased by your company and the two coal companies were merged so that your coal mining operation will, in the future, be conducted by but one company; and you will be, through your subsidiary company, the Penn-Mary Coal Co., the exclusive owner and operator of the entire 16,000 acres of coal lands.

To provide for the payment of the outstanding balance of short-term notes, issued at the time of the purchase of these coal properties which came due on April 15 last, and to reimburse your company for advances made to the Penn-Mary Coal Co., that company has sold $2,000,000 thirty-year 5 per cent gold bonds, secured by mortgage on its property, and guaranteed, principal and interest, by your company.

With reference to the ore mining operations in Cuba, these figures are presented:

Your subsidiary company, the Spanish-American Iron Co., produced from its old mines, near Santiago, in the Island of Cuba, 452,000 tons of iron ore in 1908, compared with 500,000 tons in 1907. Because of the small demand for iron ore from your steel-making companies but little more than half of this ore was shipped, the remainder having been stockpiled in Cuba. Explorations made during the year have added to the ore in sight in these old mines an amount fully equal to that mined during the year. The development of the Spanish-American Iron Co.'s property at Mayari, on the north coast of Cuba, has been vigorously prosecuted during the year, and it is expected that shipments of iron ore will begin during the coming summer. The funds for the development of this property have been provided by the sale of the $5,000,000 bonds authorized two years ago.

As to projected work concerning which heretofore unofficial statements have been given currency in some quarters, the report says:

During 1909, it is intended to complete the work already planned for improving the methods of mining at the Cornwall ore banks in which the Pennsylvania Steel Co. of Pennsylvania, owns a majority interest. Plans have been prepared for an open-hearth steel plant at the works of Maryland Steel Co., and this plant will be begun immediately and pushed to completion as rapidly as possible. These two improvements, together with the completion of the development of the new iron mines in Cuba by the Spanish-American Iron Co., comprise the only new work in contemplation for the year 1909.

ORGANIZATION OF THE FRANKLIN STEEL CO.

The Franklin Rolling Mill & Foundry Co., Franklin, Pa., was recently reorganized under the name of the Franklin Steel Co., with the following officers: President, E. B. Leigh, of Chicago; vice president and general manager, Edward E. Hughes, of Franklin, Pa.; assistant general manager, C. F. Mackey; and secretary, L. W. Barnette. The directors include Mr. Leigh, Mr. Hughes, E. T. Walker of Chicago, E. L. Adreon of St. Louis, Charles S. Gleed of Kansas City, O. D. Bleakley and Charles W. Mackey, of Franklin, Pa. The reorganized company has taken over the rights and franchises of the old company, and has issued $200,000 of bonds and $750,000 stock, fully paid. The foundry department has been discontinued, and the new corporation is now operating one 18-inch mill and one 12-inch and 18-inch Belgium train. It will continue to manufacture the "Tripartite" steel pole and steel bars for the reinforcement of concrete, as well as miscellaneous agricultural and special sections.

IRON AND STEEL IMPORTS AND EXPORTS.

The imports of "ingots, blooms, slabs, billets and bars of steel, and steel in forms not elsewhere specified" amounted in March to 2,853,278 pounds or 1,321 gross tons, valued at $209,217, or about 7 cents a pound. These imports are chiefly fine steel, including tool steel, some of which must have ranged in value much over 10 cents a pound. There was a sharp increase over February, which showed only 605 tons, while the January imports were 1,413 tons.

Imports of wire rods also showed a gain, amounting to 1,022 tons in January, 812 tons in February and 1,400 tons in March. These rods in March were valued at about 2¼ cents a pound.

The total iron and steel imports have varied but little, being 19,783 tons in January, 19,408 tons in February and 20,714 tons in March. The monthly average in 1908 was 17,250 tons, of which "pig iron," presumably chiefly ferro-manganese and spiegeleisen, comprised 7,683 tons. In the first three months of this year these pig iron imports have averaged 10,471 tons a month.

IRON AND STEEL EXPORTS, GROSS TONS.

	March,		Nine months ending March,	
	1908.	1909.	1908.	1909.
Scrap	1,940	2,345	13,111	15,219
Pig iron	2,543	2,792	38,838	35,005
Billets, sheet bars, etc.	23,444	8,453	79,660	72,919
Wire rods	356	1,653	4,958	7,709
Rails	10,171	17,027	231,316	164,275
Structural iron and steel	13,185	8,815	107,047	80,665
Bar iron	520	2,207	11,494	8,401
Steel bars	5,830	5,058	53,794	34,989
Sheets and plates	7,743	13,688	79,758	91,574
Tin plates	2,639	7,431	7,671	3,268
Hoop, band and scroll	181	273	7,784	2,706
Wire	12,236	13,077	120,857	97,719
Wire nails and spikes	3,235	2,601	30,390	20,690
Cut nails and spikes	582	682	4,326	5,152
All other, including tacks	340	836	4,723	5,038
Pipes and fittings	11,736	14,584	138,423	88,501
Totals	96,681	94,522	934,150	733,830

IRON AND STEEL IMPORTS, GROSS TONS.

	March,		Nine months ending March,	
	1908.	1909.	1908.	1909.
Scrap	434	249	16,966	4,245
Pig iron	5,711	10,771	186,773	77,168
Billets, bars and steel n. e. s.	1,054	1,321	13,785	9,594
Wire rods	1,025	1,409	11,125	8,914
Rails	28	364	2,209	1,501
Structural	41	310	1,366	4,928
Bar iron	1,949	1,419	30,515	12,795
Sheets and plates	180	503	1,985	2,430
Tin plates	5,343	4,328	42,380	34,342
Hoop, band and scroll	151	40	437	933

The annual meeting of the American Iron & Steel Institute, which was scheduled for May 3, was adjourned to a later date as yet undecided, owing to the fact that no quorum was present.

RAILS FOR ENGLAND

Are Being Rolled by Dominion Iron & Steel Co.

Toronto, Canada, April 30.—The Dominion Iron & Steel Co., of Sydney, N. S., has received an order from the Great Northern Railway Co., of Sheffield, Eng., for 5,000 tons of 85-pound steel rails. This is the first order for rails which the company has received from England. New rolls have had to be made in order to fill the contract, which calls for bullhead rails, differing considerably from the ordinary flange in use in Canada. The first consignment will shortly be shipped.

The Temiskamy & Northern Ontario railway commission has placed an order for four freight and two passenger engines with the Canadian Locomotive Co., of Kingston, Ont. They have also ordered seven conductors' vans with steel underframes from the Silliker Car Co., of Halifax, N. S.

E. J. Chamberlin, general manager of the Grand Trunk Pacific, who has returned to the east after a six-weeks' tour of inspection, states that every bridge between Winnipeg and Edmonton has been completed and the track is now being laid on the last 50 miles between the two cities. Fifty stations are under construction between Winnipeg and Wainwright.

The foundry of Butterworth & Co., Ltd., Ottawa, has been purchased by the Fleming Grate Bar Co., Ltd., of which H. W. Chamberlain is president and A. F. Chamberlain, secretary-treasurer. The company is increasing its capitalization from $40,000 to $89,000, and will enlarge the Butterworth plant for the manufacture of their specialty, the Fleming grate bar—a hollow bar which conducts air from the front of a furnace discharging it at the bridge wall, where it meets the unconsumed carbon and completes the combustion. It is claimed to be a fuel saver in addition to largely doing away with smoke.

Manufacturers Interested.—The investigations known as the Pittsburg Survey, conducted with the support of the Russell Sage Foundation, are bearing fruit in the different parts of the country. The general assembly of New York has passed a bill providing for a commission to study industrial accidents, and the New York branch of the Association for Labor Legislation has issued a pamphlet giving the gist of the Pittsburg investigations with respect to industrial accidents. The New York State Bar Association is interested in the subject, and has a special committee on employers' liability. Paul U. Kellogg, editor of the *Survey*, New York, has received letters from manufacturers in different parts of the country expressing interest in the recent investigations, especially in what might be called the home end as distinct from the mill end of the accident question and manifesting considerable practical interest in the subject.

SIR HUGH BELL RETAINS PRESIDENCY OF IRON & STEEL INSTITUTE.

A special meeting of the council of the Iron and Steel Institute was held at the office, 28 Victoria street, London, April 20, under the presidency of Sir Hugh Bell, Bart., to consider the situation created by the resignation of the president-elect, Sir W. Thomas Lewis, Bart. A resolution of regret that Sir W. Thomas Lewis had found himself unavoidably precluded from assuming the office to which he had been elected was passed, and at the unanimous desire of those present Sir Hugh Bell consented to retain the presidency for a further term of 12 months. In that capacity he will, therefore, take the chair at the annual meeting and at the dinner on May 13 and 14, respectively.

A meeting of members was held subsequently to consider the arrangements for the autumn meeting to be held in London on September 28, 29 and 30. It was decided to invite all of the London members to join the general reception committee and an executive committee was formed consisting of the following gentlemen: Sir Hugh Bell, Bart., Sir Robert A. Hadfield, F. R. S., Sir Lloyd Wise, Prof. A. K. Huntington and Messrs J. Angus, P. B. Brown, R. E. Commans, J. Dewrance, Dr. M. Ekenberg, F. W. Harbord, Harold Jeans, W. G. Kirkaldy, E. F. Law, O. A. Malmberg, J. F. Melling, A. O. Meyjes, A. E. Pratt, Leslie S. Robertson, A. Serena and Septimus Young.

The annual convention of the National Association of Manufacturers will be held at the Waldorf-Astoria hotel, New York City, May 17-19, with a banquet on the evening following the concluding session. President James M. Van Cleave has made the positive announcement that he will not accept re-election.

BRITISH CONDITIONS

In Manufacture of Iron and Steel Investigated.

The conditions of the British iron and steel industry are reviewed in a report to the bureau of manufactures of the department of commerce and labor by a special agent, Charles M. Pepper. According to Mr. Pepper, the annual output of iron ore in the United Kingdom ranges from 13,500,000 tons to 15,700,000. About one-half of the pig iron which is manufactured is from imported ore, Spain being the chief source of supply. More than 21,000,000 tons of native coal are used in the blast furnaces.

A deduction drawn from statistics extending over a third of a century is the comparative steadiness of the quantity of native iron ore mined and the variation in values, the latter being on a gradually lowering scale. Thus in 1873 an output of 15,577,000 tons was valued at $38,857,000, while in 1907 15,731,000 tons were valued at $21,575,000.

Figures are quoted of the cost of production of pig iron in the leading manufacturing districts, ranging from $9.92 on the east coast to $13.45 a ton for the Bessemer or hematite of the west coast. The ultimate cost per ton of British steel in Bessemer works having auxiliary blast furnaces is given as $23.35 for steel ingots and $18.40 for steel rails. The cost of the pig iron in this manufacture is placed at $13.50. Wages are given as follows, per ton of pig iron, $1.66; per ton of ingots, 69 cents; per ton of rails, $1.66.

The report says that difference of opinion exists among British iron and steel manufacturers as to the future of the industry, but they are not worried over the possibility of the industry disappearing through the exhaustion of the natural sources of supply.

Wages in the iron and steel mills are adjusted according to a sliding scale automatically by an agreement between the employers and workingmen. Increases were made every year from 1898 to 1907 inclusive, except 1901, 1903 and 1904. During 1908 the net reductions were between 10 and 12 per cent and further reductions were in progress on Jan. 1 last.

Analysis of the exports by countries shows that the United States and Germany are the best customers for pig iron. In 1907, 435,000 tons, valued at $10,772,000, were exported to the United States, but in the following year the quantity dropped to 70,000 tons, valued at $2,307,000.

HOW PRODUCTS ARE SOLD.

Uncertainty on the part of buyers is frequently encountered in the iron and steel market as to the tonnage unit upon which selling prices of various products are based. The net ton is the most generally used and where such is the case, basing quotations are on one or 100-pound quantities, as for instance 1.30c Pittsburg per pound or $1.30 Pittsburg per 100 pounds on plates, 1.15c or $1.15 Pittsburg, on steel bars, etc. Most of the finished lines including plates, sheets, skelp, merchant bars, hoops, bands, shapes, tubular goods, wire, nails, etc., are sold at net tons. In tin plate the basing prices are on the 100-pound box and in cotton ties, on the bundle.

Fixed ton prices are the rule where products are sold on the 2,240-pound or gross ton basis, which is the case with semi-finished steel such as billets, sheet bars, slabs, wire rods, etc., muck bar and old material. Scrap, however, is sometimes sold by net tons and skelp is sometimes dealt in at gross tons. Rails are about the only finished product to which the gross ton applies.

Pig iron is usually sold at gross tons of 2,240 pounds though with some furnaces, the old computation of 2,268 pounds per gross ton or "sand ton" still prevails. The gross ton also applies to ferro-alloys. Coke is figured at net tons.

A conversion table into net and gross ton prices, computed on base quotations, is as follows:

1 Lb.	100 Lbs.	Net Ton 2000 Lbs.	Gross Ton 2240 Lbs.
$0.005	$0.50	$10.00	$11.20
0.0055	0.55	11.00	12.32
0.006	0.60	12.00	13.44
0.0065	0.65	13.00	14.56
0.007	0.70	14.00	15.68
0.0075	0.75	15.00	16.80
0.008	0.80	16.00	17.92
0.0085	0.85	17.00	19.04
0.009	0.90	18.00	20.16
0.0095	0.95	19.00	21.28
0.010	1.00	20.00	22.40
0.0105	1.05	21.00	23.52
0.011	1.10	22.00	24.64
0.0115	1.15	23.00	25.76
0.012	1.20	24.00	26.88
0.0125	1.25	25.00	28.00
0.013	1.30	26.00	29.12
0.0135	1.35	27.00	30.24
0.014	1.40	28.00	31.36
0.0145	1.45	29.00	32.48
0.015	1.50	30.00	33.60
0.01525	1.52½	30.50	34.16
0.0155	1.55	31.00	34.72
0.01575	1.57½	31.50	35.28
0.016	1.60	32.00	35.84
0.01625	1.62½	32.50	36.40
0.0165	1.65	33.00	36.96
0.01675	1.67½	33.50	37.52
0.017	1.70	34.00	38.08
0.01725	1.72½	34.50	38.64
0.0175	1.75	35.00	39.20
0.01775	1.77½	35.50	39.76
0.018	1.80	36.00	40.32
0.01825	1.82½	36.50	40.88
0.0185	1.85	37.00	41.44
0.01875	1.87½	37.50	42.00
0.019	1.90	38.00	42.56
0.01925	1.92½	38.50	43.12
0.0195	1.95	39.00	43.68
0.01975	1.97½	39.50	44.24
0.020	2.00	40.00	44.80

DUTY ON IRON ORE

WILL PROBABLY BE RETAINED BY THE SENATE,

But Action of Conference Committee is Uncertain—Slight Reductions May be Made on Other Rates of the Metal Schedule.

Washington, D. C., May 10.—Those who are watching the tariff revision program with special reference to the metal schedule find in the situation as it has developed during the past week evidences of a disposition to retain senate bill rates on iron ore, with possibly, slight reductions from the duties carried in the bill as it was reported by the finance committee on some of the higher grades of iron and steel manufactures.

These ideas are predicated upon the fact that the debates in the senate up to this time, and such votes as have been taken on items in the chemical schedule, show a disposition on the part of the senate to retain Dingley law rates, or what are regarded as approximately those rates, for protective purposes, upon raw materials. The most striking illustration of this was the vote in the senate on the retention of the Dingley law duties on the lead contents of ore. Notwithstanding the sharp opposition to advanced duties on lead products by Republican senators who favor reducing duties below the Dingley law scale, the senate by a pronounced majority, including the western senators who have objected to high duties, and two or three Democrats, carried into the bill the Dingley law rates on lead ores. This is accepted by observing senators as indicating the policy of the senate to be in favor of maintaining protective rates on materials. If this idea shall prevail throughout all the schedules of the bill, the rate of 25 cents per ton on iron ore will easily be carried, even in the face of the apparent disposition of the senate to reduce the metal schedule considerably below the general average ad valorem rates of the tariff.

The idea that some decreases will be made on finished products in the metal schedule is based upon concessions that are sought by senators from the agricultural sections upon fence wire, and certain grades of round iron bars and merchant steel bars that are utilized by the interior smiths and machinists and by manufacturers of agricultural implements. The reductions that have thus far been reported in the bill on the general items of the iron and steel schedule have been so satisfactory even to those senators who are demanding sharp reductions in tariff rates, that the satisfaction of these senators has been expressed with the senate bill rates and without any special disposition among these senators to demand further reductions.

Protective Propositions.

In addition to the issues that have been raised regarding lead ores and lead products, sharply defined questions are brought out in connection with the proposal contained in the Payne bill for placing the zinc contents of ores in the dutiable list, and the provision pending before the finance committee for increasing the duties upon small sizes of plate glass. These are squarely protective propositions. The senate committee has not yet agreed upon the course to be pursued with respect to zinc ores, and the decision when made will naturally affect the rates of duty on spelter. No decision has been reached with regard to the controverted questions involving large and small sizes of plate glass. The manufacturers have indicated a willingness to see the duties on the large sizes of plate glass somewhat reduced, if advanced rates are authorized upon the smaller sizes for protective purposes. It will depend, in a material degree, upon the course pursued by the senate with respect to these items what shall be done with many of the paragraphs in the metal schedule which cover the "spread" in rates between raw materials and finished products.

The senate committee on finance practically ceased labor on the details of the unreported sections of the bill during the past week. For this reason, the settlement of a number of controverted questions, in addition to those already indicated, has been deferred. The only new features of the bill brought out from the committee during the week were the radical changes made in the customs administrative act of 1890 as they had been agreed upon by the committee.

The changes in the customs administrative act are of tremendous importance to the metal trades and to everybody who is interested in the importing of materials or finished products. The chief aim of the changes proposed in the laws governing the administration of the customs is embraced in those sections of

the law which are intended to guard against undervaluations. The broad declaration is made by members of the finance committee that the loopholes in customs administration will be so thoroughly tightened up by these sections of the bill, if they become a law in practically the form they are now before the senate, that additional protection safeguards will be given to domestic industries from foreign competition and such safeguards against undervaluations that the treasury of the United States will be enriched to the extent of $20,000,000 to $30,000,000 additional each year. It must be apparent that the enforcement of these additional duties will operate to curtail importations, to some extent at least, for the more stringent provisions of the customs administration will discourage imports while at the same time compelling full payment of duties upon all articles brought into our ports.

Delay in the completion of the above mentioned features of the tariff bill and the attention which the finance committee members have been compelled to give to the preliminary debate in the senate on the particular items in the bill, have rendered it impossible for the committee or the senate to make much progress during the week. Test votes and questions of policy have engrossed the attention of the senate leaders. This will cause a delay in passing upon the different provisions of the metal schedule. Until that schedule is taken up, the details of minor amendments to be proposed by the committee will not be made public.

Conference Committee.

In connection with the question of duties upon ore, coal, and kindred products, it is certain that the bill will be perfected almost wholly in the conference between the two houses. It is generally recognized that the rates of the Aldrich bill have been placed higher than they will finally appear in the completed bill, and certain concessions will necessarily be made on many items, due to the pressure from the representatives of the eastern manufacturers, who are demanding more encouragement for the importation of materials. This question particularly affects ore, coal, hides and articles of this class.

Pig Iron Duty.

With the present retention of the 25 cents a ton duty on ore, there is continued pressure for an increase of the rate on pig iron from $2.50 to $3 a ton. The issue still remains to be fought out in the senate and in conference regarding the relative rates on pig iron and scrap iron. It is also expected that the sharp advances made, by means of new provisos and changed language covering all the higher finished products, will be worked out upon a more satisfactory basis when the metal schedule is taken up for consideration by paragraphs in the senate.

The latest intimation of suggested amendments in the metal schedules cover a change in the rates on wire for fencing, in the direction of lower duties, and at the same time raising the rate on wire nails. By a concession to the users of wire fencing, by a reduced rate on wire, it is expected that a slightly increased rate may be given on the item covering wire nails.

ARTHUR J. DODGE.

ORE ON DOCK MAY 1

Shows Slight Decrease, Compared with Last Year—Annual Shipments.

Statistics gathered from the various dock managers at Lake Erie ports show that the amount of ore on Lake Erie docks May 1 of the present year was 5,370,268 gross tons, as against 5,480,300 tons in 1908, a decrease of 110,032 tons.

The total rail shipments from Lake Erie ports to furnaces during the winter season (Dec. 1 to May 1) aggregated 3,071,265 tons, viz.:

On dock Lake Erie ports, Dec. 1, 1908	8,441,533
On dock May 1, 1909	5,370,268
By rail to furnace, winter of 1908-9.	3,071,265

Adding these winter shipments to 17,453,258 tons, the amount shipped to furnaces during the navigation season of 1908, gives 20,524,523 tons as the entire shipment of ore from Lake Erie ports during the year ended May 1, 1909, as compared with the following shipments for the same period of other years:

Year ended May 1, 1908	31,692,446
Year ended May 1, 1907	30,099,769
Year ended May 1, 1906	28,934,358
Year ended May 1, 1905	20,057,070
Year ended May 1, 1904	18,739,995
Year ended May 1, 1903	21,905,251
Year ended May 1, 1902	17,216,065
Year ended May 1, 1901	14,465,260
Year ended May 1, 1900	15,882,881
Year ended May 1, 1899	12,122,982
Year ended May 1, 1908	10,209,488

The following table gives the amount of ore on dock at the opening and closing of navigation for 10 years past:

IRON ORE ON LAKE ERIE DOCKS—GROSS TONS.

	Opening of Navigation			Close of Navigation		
Ports.	May 1, 1909.	May 1, 1908.	May 1, 1907.	Dec. 1, 1908.	Dec. 1, 1907.	Dec. 1, 1906.
Toledo	380,675	217,788	147,397	590,925	518,645	281,000
Sandusky	31,528	42,256	5,439	36,079	44,546	17,467
Huron	379,364	392,731	98,106	458,158	415,730	245,499
Lorain	362,096	327,052	176,300	426,274	366,271	336,321
Cleveland	1,018,055	1,029,198	447,573	1,458,392	1,281,335	1,224,606
Fairport	562,679	225,328	154,246	835,821	523,981	590,783
Ashtabula	1,392,430	1,799,454	568,485	2,293,531	2,056,820	1,631,312
Conneaut	497,203	462,392	139,853	1,296,675	1,090,774	1,057,424
Erie	557,029	595,660	189,276	730,530	652,219	552,631
Buffalo	189,209	388,441	50,313	315,148	435,407	315,412
Total	5,370,268	5,480,300	1,976,988	8,441,533	7,385,728	6,252.455

WORKS' OUTPUT

For Dominion Iron & Steel Co. for Almost Full Year.

Toronto, Canada, May 8.—The official figures showing the output of the Dominion Iron & Steel Co., Sydney, N. S., for the 11 months ending April 30 are as follows: Pig iron, 260,137 tons; ingots, 259,984 tons; blooms, 250,500 tons; rails, 123,830 tons; rods, 46,111. For the separate month of April the output was, pig iron, 22,760 tons; ingots, 24,815 tons; blooms, 23,947 tons; rails, 12,836 tons, and rods, 4,297 tons. The company is under contract to deliver 15,000 tons of steel rails to the Grand Trunk Pacific at Prince Rupert, B. C., in August next. The original intention was to ship them by steamer around Cape Horn, but to save time it has been decided to send the rails across Panama by the Tehuantepec railway. C. H. Macmillan, former superintendent of the Dominion Iron & Steel Co., who has been recuperating in Maine for about a year, has been appointed superintendent of the steel department of the company and assumed his duties May 1.

The Algoma Steel Works, Sault Ste. Marie, has been given a contract for 2,000 tons of 80-pound rails for the Temiskaming & Northern Ontario railway.

Haney, Quinlan & Robertson, who have the general contract for the erection of the Grand Trunk Pacific Railway shops at St. Boniface, Man., have awarded a contract for the whole of the structural steel required, amounting to nearly 5,000 tons, to the Manitoba Bridge & Iron Works, Ltd., of Winnipeg, the contract price being about $350,000.

The Canadian Seamless Steel Co., Ltd., a branch of the Seamless Steel Mfg. Co., of Detroit, will establish a plant costing about $125,000 at Welland, Ont., for the manufacture of bathroom fixtures and heavy articles of pressed steel. Seventy-five hands will be employed at the start.

Milton furnace of the Wellston Steel & Iron Co., Wellston, O., went out of blast April 28 in order to make a number of necessary repairs.

GAS POWER FOR ROLLING MILLS

By Dr. Franz Erich Junge-Hermsdorf.

This discussion is limited to a large modern combined iron and steel works, which embrace all the various departments, wherein the original ore charged at one end of the plant is transformed into finished and salable goods, rails, plates, sections, etc., delivered at the other; such plants having preferably neighboring coal mines and coke ovens attached to them, so that the required fuels, coal and coke, can be obtained and utilized at the lowest possible price. It is only by thus eliminating all unnecessary leakage that maximum industrial economy and the capability to compete successfully with other producers can be obtained.

Enough has been said on blast furnaces, coke ovens and gas producers as the three available sources of power generation for combined plants of this order and magnitude. Suffice it to recapitulate that a blast furnace of 250 tons daily capacity, using approximately 10 tons of coke per hour, will yield sufficient gas for a continuous generation of 10,000 effective horsepower, of which about 25 per cent are used at the furnace proper, for blowing, hoisting, water supply, lighting, etc., leaving 7,500 horsepower available for driving rolling mills, and generating electric current either for sale or for other purposes. A modern regenerative by-product coke oven with a daily output of 200 tons will yield gas power to the amount of 1,800 to 2,100 horsepower, depending on the quality of coal used, the quantity of which approximates 10 tons per hour for an oven of the above size.

If dust coke and coke breeze, which remain available at the plant, are gasified in producers especially built for handling such fuel, an additional amount of from 900 to 1,000 horsepower in gas engines can be obtained, running the total available power from the coke oven plant up to 3,000 effective horsepower. The heat balance of blast furnaces and coke ovens is graphically shown in Figs. 1 and 2, while the relative utilization of blast furnace gas in steam and gas engines respectively is presented in diagram, Fig. 3. Fig. 4 shows the relation of heat consumption and of annual cost, including interest, amortization, upkeep, operating expenses and expendi-

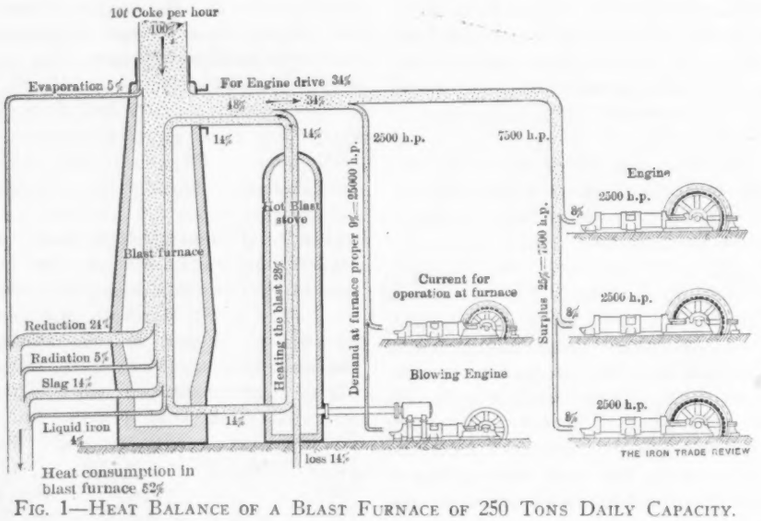


Fig. 1—Heat Balance of a Blast Furnace of 250 Tons Daily Capacity.

tures for fuel for steam power and gas power respectively, when boiler coal is used for raising steam, and dust coke for generating gas in the producer. These diagrams represent the condensed experience of the Nurnberg engineers, who can claim greater familiarity with the subject than any other set of men on earth. Of course, the influence of the load factor is not taken into account.

If coal mines are located near the plant we have in addition to the above named fuels inferior grade of coals, mine culm and other waste, which cannot be profitably transported to markets and are therefore transformed into superior forms of energy, gas, electric current, by-products, at the mouth of the pit, preferably by the aid of gas producers. The provision of a bank of gas producers, which can deliver a regulable amount of rich gas, after yielding its contents of valuable by-products in the ammonia recovery plant—is desirable for several reasons. With unstable conditions of iron production so typical in these days, and with the high pressure working of all parts of the equipment, likewise characteristic, there is an urgent necessity for a reserve gas supply. If a blast furnace is shut down, either on account of a depression on the money market or for showing signs of distress, the gas producer may be drawn upon to deliver the required energy to stoves, engines, boilers, etc. Also when there is need of higher blast pressures, as sometimes happens. With steam-blowing engines it is easier to get sufficient pressure on when gas is used under the boilers than when direct coal firing. Also, with gas firing, the efficiency of coal conversion, or the calorific effect attained is from 5 to 25 per cent greater and the labor is less.

Producer gas, moreover, permits at all times of perfect control, allowing less variation in the amount of air blown through the furnace, thus giving greater regularity of product. By regenerating blast furnace gas with the aid of producer gas of higher heat value, the plant fuel consumption can be reduced to about 40 per cent of the ordinary. (When steel furnaces are fired with ordinary gas, rolling mills being driven by steam power and heating stoves being fired with coal, then the total consumption runs up to about 100 per cent of the finished product.) The scheme of installing reserve gas producers is now being generally recommended, allowing of concentration and control of fuel conversion at one central place with all resulting advantages and growing the more efficient the larger the plant.

Regenerating blast furnace gas with producer gas renders it at once useful for firing steel furnaces, at the same time eliminating the irregularity of its composition, which varies between 85 and 106 B. T. U., thus making it better fit for gas power work. For the engines grow smaller in size or higher in capacity the greater the calorific value of the gas used. Which of the three available gases, blast

furnace, coke oven or producer gas, or which combination of them, is to be used for heating purposes on the one hand, or for power purposes on the other, depends entirely on the character of the particular plant, on the utilization coefficient of gas used for heating purposes versus gas used for power purposes, on the intrinsic values of the respective fuels, which are replaced by the utilization of either gas, on the relative first cost of the gas heating appliances versus gas power equipment and on other items.

The intermittent working of the machines that derive their power from the central station, and which together determine the plant load curve, is one of the main factors to consider. It is decisive for the selection of either turbo generators or of gas generators in the central station. If, as is the case in modern German practice, the central station does not only serve to deliver current to various auxiliaries and accessories, but also to the rolling mills, then the plant load factor grows less favorable, more fluctuating, because the average consumption of energy by mills, with but few exceptions, is hardly higher than from 1/3 to ½ of the maximum driving force required at occasions. It becomes necessary, therefore, to analyze the heat consumption of gas dynamos on the one hand, and of turbo dynamos on the other, with due consideration of partial loads, which will often swing the decision in favor of steam, or to say it better, will render the commercial superiority of gas power less pronounced.

In this connection a calculation made by Riecke may prove of interest. He compares the efficiency of three gas engines of 1,500 horsepower each and of one turbo generator of 2,500 kilowatts at various loads.

Loads	1/1	3/4	1/2	1/3
Calories used	2,480	2,690	3,550	5,000
Generator efficiency.	0.94	0.935	0.915	0.88

Assuming a maximum required capacity of 3,000 kilowatts, the 2,500 kilowatt turbo generator, including exciter and condensation, will show the following:

Load	1/1	3/4	1/2
Kilograms steam used..	6.7	7.1	7.9

To generate one kilogram of steam at 160 pounds pressure, (330 degrees Cent. at the boiler) 1,025 calories are required, provided the feed water is delivered to the boiler at 30 degrees Cent., the plant including an economizer. With cleaned blast furnace gas a utilization of 68 per cent of the heat introduced into the system is quite possible. A comparison of the specific heat consumption curves of the two equipments measured at the bus bars and of the total heat used by each shows, what is clear also from mere theoretical reflection, that at low loads the heat consumption of the gas engines decreases at a slower rate than that of the turbines. The following values are obtained: Mean yield of energy, 1,640 kilowatts; mean heat consumption of steam turbine driven central stations 12.43×10^6 calories; mean heat consumption of gas engine driven central station 8.28×10^6 calories. This shows that with gas-fired boilers the heat consumption is about 50 per cent higher than with gas power, the numeric amounts being 7,580 calories per kilowatt-hour with steam power, and 5,050 with gas power.

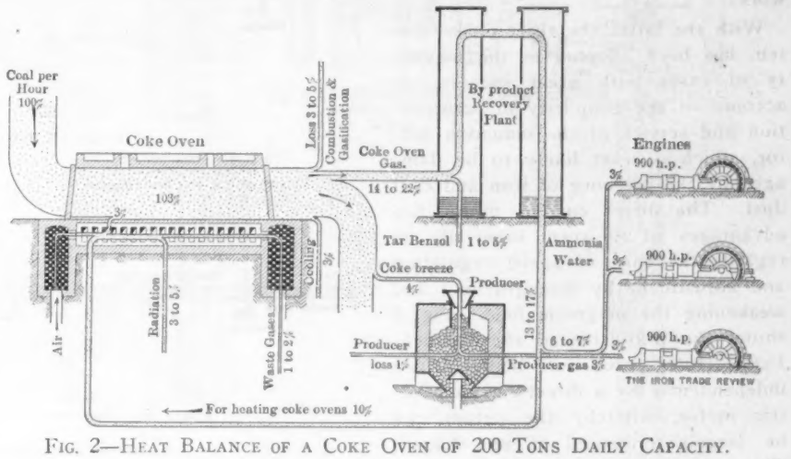


FIG. 2—HEAT BALANCE OF A COKE OVEN OF 200 TONS DAILY CAPACITY.

(The average consumption per indicated horsepower in gas engines is figured as 3 cubic meters, blast furnace gas having an average calorific value of 900 calories per cubic meter, the engine efficiency being assumed as 0.8 and the mean efficiency of the generator as 0.915, giving a consumption of 5,020 calories per kilowatt-hour for gas power, under the above outlined conditions.)

Hence we may conclude: Electric central stations in combined iron and steel works, which are to deliver current besides to the auxiliary machines, also to the rolling mills, have to contend with a very fluctuating load curve. When equipped with turbo generators, they consume approximately 50 per cent more heat than do gas generators, while under more favorable conditions, when the engines in the central station can be made to operate under full load continuously, the difference in favor of gas power is 100 per cent and more. In short, where there is a market for the surplus current, which can be generated by efficient utilization from the available gases, or by the conversion in producers, of inferior grades of coal and coke in the combined works, then large gas engines must invariably be adopted in the central station. Clean gas, clean water and an efficient staff of attendants are the principal requirements for the continuous operation of gas power plants today. Gas engines of standard design will meet all requirements of electric service.

With a central electric station of ample capacity and reserves,—we have such running from 6,000 up to 50,000 horsepower—there is, of course, no necessity for driving even the larger roll trains directly with gas engines. In the central station all the weak points of the gas engine—and the lack of overload capacity is one of the most important—can be most effectively counteracted and maximum industrial economy by proper service secured. On the other hand are the advantages of complete electric centralization so obvious that after fitting the electric motor for the new service, electric drive of mills of all types is coming more and more into general use, notwithstanding the higher first cost and the greater floor space occupied by the electric equipment. The reliability and durability of electric motors is greater than that of any other type, parts are easily exchanged, oil consumption and attendance required are small, the power consumed by the mills can be easily controlled in the central station, etc. All this is well known. Also that electric motors must have ample capacity for rolling work.

For direct roll drive, and more especially for heavy work, gas engines

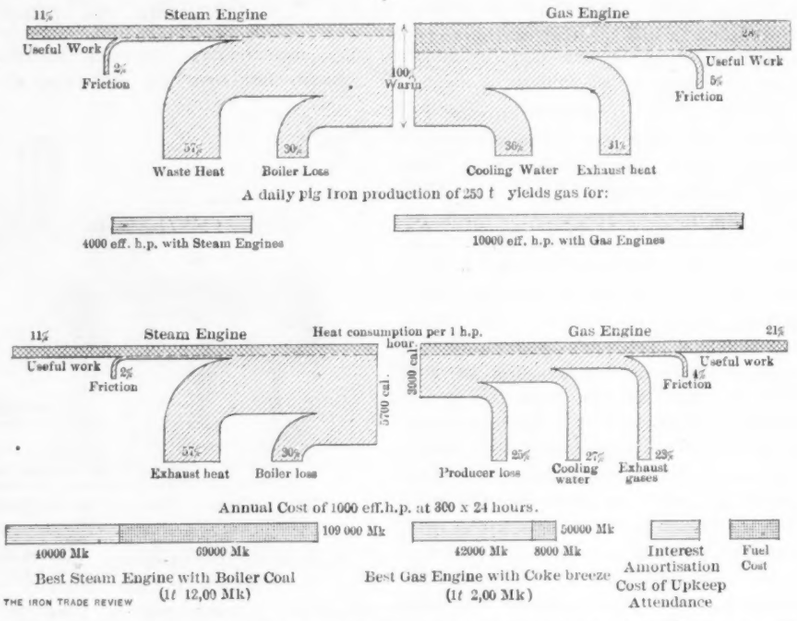
are not fitted for several reasons: In order to render the maximum possible driving force under widely fluctuating load conditions gas engines must be even of much higher capacity than electric motors. Hence at the lower loads they work very much below their maximum efficiency, thus spoiling the good effects of gas power and leaving only its drawbacks. If the rolling mills are located at some distance from the furnace plant, things are worse, because, in order to keep the expense for gas conducting pipes within reasonable limits, the gas must be compressed, a reserve compressor provided, a gas tank installed near the mills in order to equalize fluctuations in the gas supply, pipe lines must be kept free from dust, etc., so that the total cost may even exceed those of central electric drive all over the works.

With the latter the three-phase system has been adopted in the majority of cases with great success, on account of the simplicity in construction and service of the induction motor, which is least likely to be damaged by the presence of iron and coal dust. The direct current motor has advantages of its own, especially as regards the ease of speed regulation and adjustment by strengthening and weakening the magnetic field. Fig. 5 shows the mill-drive of the Bethlen-Falva Hutte, each roll being driven independently by a direct-current electric motor, whereby the output can be largely increased if so desired. This plant is especially interesting in that it receives its supply of three-phase current from an overland net, of which we have many distributed all over the country. The current is received at the substation at 5,000 volts and is transformed to direct current at 500 volts, the rotary converter carrying an Ilgner flywheel, which absorbs the load fluctuations almost entirely and protects the net and the central stations from undue maxima.

But there are other mills using three-phase current directly from the overland net of the "Verbandeselektrizitatswerk," without any attempt to equalize load fluctuations, though the latter run from 1 to 7 in heavy work. Motors of 2,000 horsepower normal and 4,000 horsepower maximum capacity, are of no rare occurrence in modern German practice. In reversing mill work, for instance at Georg Marienhutte, an electric motor of 7,000 horsepower maximum capacity is employed, and there are many installations of lesser size. In 1906, there were already 170 electric drives for rolling mills with an annual capacity of about 100,000 horsepower, built or ordered in Germany. As the total power used in our iron and steel industries for rolling is about 800,000 horsepower, there is plenty of work ahead for the electrical industries in this branch, as well as in the electric equipment of mine hoists, which are almost of identical character, and have served as a model to the electrification of rolling mills

The greatest difficulties had, of course, to be overcome when attempting to incorporate the reversing mills into the scheme of complete electric centralization of the works. Their power demand varies very widely, the difference between minimum and maximum speed being very considerable, the drop in speed (20 per cent) only occurs at maximum output, the acceleration and retardation of the heavy masses has to be effected within a very short time, etc. Yet all these difficulties have been successfully overcome and, according to Kottgen, an efficiency of electrically driven reversing mills of about 40 per cent attained.

It is not easy nowadays to find capitalists willing to lend their plants to risky and costly experiments like these. The first equipment was designed and furnished by the General Electric Co. of Berlin, for the Hildegard Hutte in Trzynietz, Austria-Silesia. A turbine-driven central station of 5,000 kilowatts is available. Fig. 6 shows the general arrangement. Three intercoupled reversing motors M, with a normal capacity of 3,600 horsepower and a maximum capacity of 10,350 horsepower at 100 revolutions per minute serve to drive the rolls. In the same room is located the Ilgner transformer, which consists of a three-phase current motor D of 2,500 horsepower, which is coupled with two starting machines arranged in series, and having a normal capacity of 1,500 kilowatts, and a maximum capacity of 4,300 kilowatts each, at 300 to 375 revolutions per minute. On each side of the motor is mounted a flywheel S, of 14 feet 5¼ inches diameter weighing 26 tons. Curves, Fig. 7 and 8, were taken during operation and show how well the equipment is able to take up the severe fluctuations of heavy mill service. The rolls can be accelerated within 2 or 2½ seconds from rest to their highest desirable speed, 11 revolutions per minute. The energy fluctuations of the mill motors rise during operation within fractions of a second from no load to 10,000 horsepower, without causing sparks at the collectors, while the equalization of energy of these constant changes from no load to full load is accomplished so perfectly, by the flywheel transformer, that the power station does not show any bad effects of it. Curves taken while rolling beams 17⅝ inches high, from two blocks, show that the demand on



FIGS. 3 AND 4—COMPARATIVE HEAT UTILIZATION IN STEAM AND GAS ENGINES AND RELATION OF HEAT CONSUMPTION AND ANNUAL COST.

the net was almost all the time 900 kilowatts or about 1,100 horsepower, the fluctuation in the power station remaining between ± 100 kilowatts, or ± 150 kilowatts at the utmost.

The Trzynietz plant has evidenced the technical and economical feasibility of incorporating reversing mills in the central electric drive of combined works, the rolling department thus profiting by the high heat efficiency of modern prime movers in the central station, whose saving can alone make up for the higher first cost and the greater floor space required by the change for direct to electric drive. As there is, however, still a difference of opinion existing among practical mill men, as to the best mode of driving rolling mills, it will be well to recapitulate here the discussion which took place as early as 1905 between German iron masters, but which even today must be considered as the classical utterance of those who are in the best position to judge.

Ortmann.

"The chief advantages of the steam engine, as compared with the electric motor or gas engine, for driving rollings mills is in the facility with which it adapts itself to the load, responding almost instantaneously to a decrease in the speed of the flywheel with more power and quickly regaining the normal number of revolutions. This is rendered possible by the fact that an engine built for a certain load is capable of exceeding it to the extent of 50 per cent. or more. The main disadvantage of this form of power is the high operating cost, and it is on this account that so many attempts have been made to replace it by the electric motor and, more recently still, the gas engine. The question is, which of these two motors offers the greater advantages, not only from an economical point of view, but also, what is frequently of more importance, in regard to the maximum security of operation?

Supply of Current an Important Item.—"For electric driving the first point to be considered is whether a sufficiently large power station is available or whether the current must be specially generated for one or two mills. This is of importance because, on account of the variations in load, the station will at times be drawn upon very heavily and the amount of power used may easily exceed its capacity, while at other times the requirements are very small. If the central station is merely sufficient for operating one or two mills this variation will prove very inconvenient. The trouble could be overcome by the introduction of a flywheel transformer for a secondary battery, and electricians would say that the solution of this problem is not at all difficult. From a technical standpoint this is true, but from an economical point of view it is a question whether such an installation would not prove too expensive. A power house with a transformer is a costly installation and could only be of advantage if the generators were run by gas engines using blast-fur-

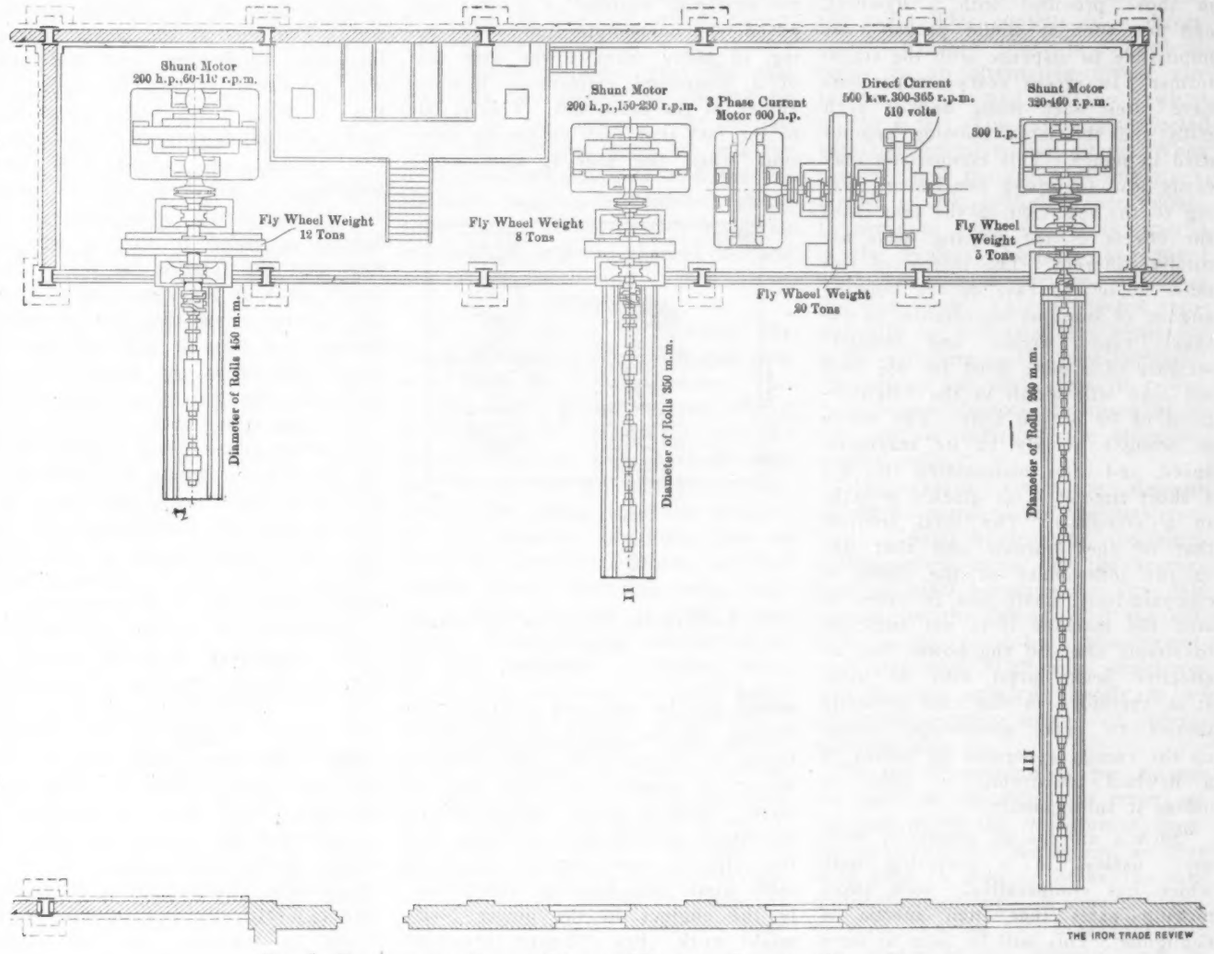


FIG. 5—ELECTRICALLY-DRIVEN ROLLING MILLS AT BETHLEN FALVA HUTTE.

nace gas. A steam-driven central station would be out of the question on account of the high operating cost. If steam engines were used it would be better to couple them directly to the mill, providing the steam line were not too long. If a large station with a capacity of 10,000 to 20,000 horsepower is available the variations in load will not be of so much importance, as the percentage of overload caused by the variation of power required in the mill will be much less.

Reversing Mills.—"In reversing mills the load varies still more than in those provided with a flywheel, and for such it would probably be impossible to dispense with the transformer. In recent years comparisons have often been made betwen such mills and the large hoisting engines used in mines. This comparison may easily lead to wrong conclusions, owing to the fact that in the two cases the effects of the moving mass are totally different. The inertia of this mass is, in the case of the hoisting engine, of supreme importance, as the cages, ropes, drums, and counterweights of a mine hoist for 4½ tons net load will weigh in the neighborhood of 90 or 100 tons. The whole is brought quickly to its maximum speed, and after maintaining this for a short time it is as quickly brought to a standstill. The total friction, that of the journals and that due to the inflexibility of the cable, is comparatively small, and in order to stop the machine it is not sufficient to simply shut off the power, but an effective brake must also be used. It is, therefore, in this case perfectly correct to brake electrically, storing up the energy generated by means of a flywheel transformer in order to utilize it subsequently.

"Such a storage of power is, however, useless in a reversing mill, which has comparatively such small moving parts that their inertia is negligible. This will be seen at once by comparison of the weights of the rolls, couplings, pinions, etc., and the distance from their axis of rotation with the size of the numerous friction surfaces. As a result, when the power is cut off, the mill will come to a standstill almost immediately, so that it is only necessary to equalize the variations in load between zero and the maximum, for which purpose a flywheel transformer could be used. Here again the question arises, however, whether the power station is of sufficient capacity and whether it is driven by gas engines using blast-furnace gas. If the latter is the case the gas should not, as electricians often assert, be figured as a waste product, but charged to the mill at its heat value, for in most plants steam is being used for one purpose or another, and this, if sufficient gas is not available, must be generated by means of coal. An electric power station with flywheel transformer and all accessories would probably cost twice or three times as much as a complete plant for direct driving by means of a steam engine.

Reversing Engines Not so Wasteful as Supposed.—"Reversing engines are not nearly so wasteful as is often supposed, the consumption of steam being, in many cases, lower than that of a compound condensing flywheel engine of the same size. This is due to the fact that such an engine never runs when the mill is idle, which

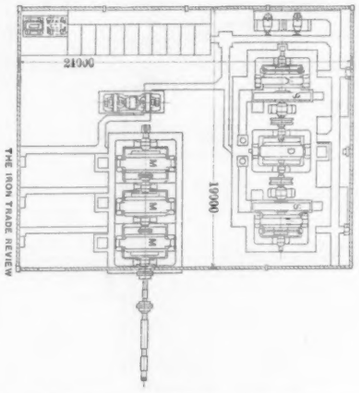


FIG. 6—ELECTRIC DRIVE OF REVERSING MILL.

would not be the case with electric driving, as the power station would hardly be stopped for a shut-down of 10 or 15 minutes or even half an hour. With a power station driven by steam engines it is unlikely that the electric operation of reversing mills would pay, however economically the engines in the power house might work. For ordinary three-high mills a transformer is generally unnecessary, variations in load as high as 25 per cent being easily taken care of in the power house by an increase of speed at most of 2 to 3 per cent.

"The question now arises whether there is any economy in driving rolling mills electrically. As stated, the necessary plant, including the power house, is very costly. It would probably be found that with a simple installation, without transformer or secondary battery, with a power house driven by gas engines, figuring a loss of energy due to the electric transmission of at least 20 per cent and including interest and depreciation, the total operating cost will be somewhat less than that of the steam engine.

Comparative Figures of Steam and Electric Installations.—"To illustrate the costliness of installing a power station and transformer some figures are given which were obtained to ascertain the relative advantages of a steam hoisting engine as against an electric installation for the same purpose. The power was to be obtained from an existing power house, and boilers were available either for a steam engine or for electric generators. The cost of the steam engine, including foundations and buildings, was estimated at $22,500, while for the electric hoist with direct-current alternating-current transformer the average of various bids was $40,000. If the cost of the power station, which may be set at $25,000, is added to this, it will be seen that the total is far more than double that of the steam installation. The figures show that the increased charges for interest and depreciation more than offset the saving in fuel and make the cost of operating much more expensive with electric than with steam power. It is probable that the same result would be obtained if similar estimates were made for a reversing mill, and that, in spite of the use of gas engines in the power house, direct driving by a steam engine would prove the more economical.

Advantages of Using Electricity.—"The advantages of using electricity are the greater security of operation and the possibility of dividing the gas engine installation into smaller units in the power house than is possible for direct driving, in which case the gas engine must necessarily be of sufficient size to run the mill. It is no doubt advantageous to drive small mills, requiring 250 to 500 horsepower, electrically, if a suitable power house is available, but for larger trains the case is different.

"In many cases where gas engines have been installed for driving mills trouble has been caused by the engine being too small for the work which it is to perform. The point has in many cases been overlooked that the gas engine's nominal power is its maximum, while with a steam engine its nominal power may be exceeded by 50 per cent or even more. A mill gas engine should have a large reserve of power, so that it may cope with steel insufficiently heated, with a greater output of the mill, or with

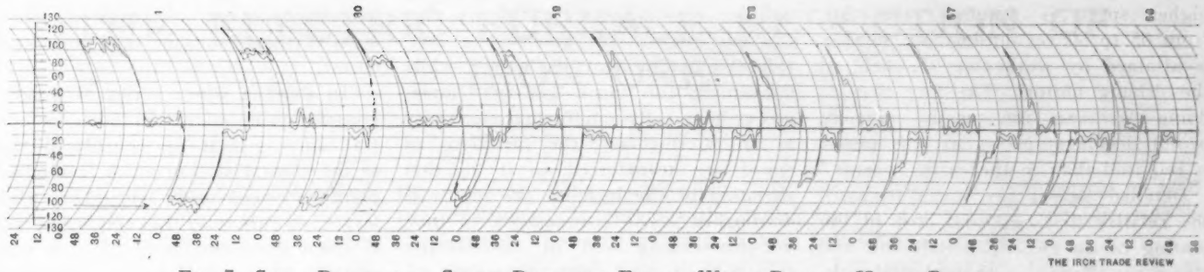


FIG. 7—SPEED DIAGRAM OF STEAM REVERSING ENGINE WHEN ROLLING HEAVY RAILS.

other factors causing an increase in the power required.

"Another point which has often led to too small an engine being installed is that the quality of blast furnace gas is very variable. It is generally stated that such gas has a heating value of 900 or even 950 calories. It is true that such a gas is often made, and sometimes one that is richer, but it is equally true that the heating value may be only 800 and as low as 750 calories. If an engine is working under its full load, which it is designed to carry with 900-unit gas, it is clear that it will not be able to do the work if the value of the gas falls as low as indicated above. Recent reports show that the gas engines driving mills directly are giving better satisfaction than is often supposed, many of the troubles which were at first experienced having been overcome. Finally it may be stated that it is advisable to use duplex engines with a large excess of power for rolling mills. It is th n possible, if one side of the engine needs repairs, to operate the mill at least partially with the other side. By this means a certain amount of reserve is acquired."

H. Wild.

H. Wild confirms Mr. Ortmann's conclusions that only in the case of small mills is there any assurance of profit in electric driving, while for large units the charges for interest, etc., will eat up anything saved in other directions. He considers gas engines using blast-furnace gas very suitable for rolling mills and has reached the conclusion that they should have 1.8 times the power of a steam engine for the same purpose. If the blast furnaces are situated any distance from the mill the gas might be compressed at its source, in order to reduce the size and cost of piping, and the installation of a gas holder is advisable in order that the mill may not too quickly be affected by trouble at the furnaces. A gas engine will not pay when the gas for it is produced specially and the installation replaces an existing steam engine, for it is not capable of saving in fuel the interest charges on the new plant and the old.

F. Weideneder.

It is interesting to compare the views of these two practical mill men with those of F. Weideneder, who compares the relative cost of driving reversing mills electrically and by means of steam engines, both with and without the use of exhaust turbines. He states that the General Electric company, of Berlin, has an order for three installations for electrically driving reversing mills, each for a maximum load of 9,000 horsepower. They will be constructed on the same principle as electric mine hoists, the variation in load being balanced by a flywheel. To quote:

"The rolls are coupled either directly or by means of gearing to the direct-current motor. For blooming mills with an average of 60 to 65 revolutions per minute, the use of gearing will be avoided. An unfavorable position of cranks, as happens with a steam engine, does not have to be taken into account, and a motor of the power in question will not be particularly expensive even at this low speed. In order that the power station may not be affected by the sudden variations in load, and to avoid the loss of energy in resistances, a transformer is installed near the mill. This consists of a direct-current dynamo, which is coupled directly to an alternating-current motor on one side and a 50-ton flywheel on the other. The motor is connected with the central station circuit. When running light the speed of this transformer is 365 revolutions per minute. In order to make use of the inertia of the flywheel, however, the speed must decrease as the loss increases and vice versa. This is affected automatically by increasing the resistance in the armature as the load increases; this causes but slight loss of power. A maximum decrease in speed of 20 per cent is sufficient for large reversing mills.

"As regards size, the dynamo should be designed for the maximum load of 9,000 horsepower, the alternating-current motor for the average load of 2,000 horsepower. The field current for the dynamo and the mill motor is generated by a transformer consisting of a 30-kilowatt, direct-current dynamo coupled directly to an alternating-current motor of corresponding size.

"Up to 65 revolutions per minute the speed is controlled by means of the current of the transformer dynamo on which it is dependent, so that it is easy to stop or brake the mill motor by reducing this current down to zero. During this braking period the inertia of the moving parts is converted into useful energy and stored up by increasing the speed of the fly wheel. In the final passes a

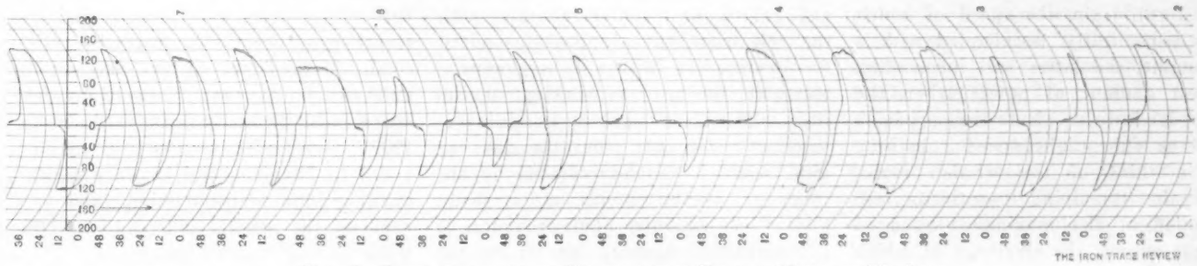


FIG. 8—SPEED DIAGRAM OF ELECTRICALLY-DRIVEN MILL AT NO LOAD.

higher speed is required, and this, from 65 to 90 revolutions per minute, is attained by weakening the field of the driving motor. The fact that so doing decreases the turning moment is not disadvantageous, as less power is required than in the earlier passes."

Detailed figures are given to show the relative first cost and cost of operating of an electric installation and steam installation, both with and without exhaust turbines. Owing to the totally different conditions these figures are of little value in this country, however correct they may be in the land of their origin, but a statement of the final results arrived at may prove interesting, as follows:

Annual Interest, Depreciation and Operating Cost.

1. Steam engine with exhaust turbine	$104,500
2. Steam engine without exhaust turbine	121,100
3. Electric drive	63,800

In all cases it is assumed that the steam is generated in coal-fired boilers and that the average load is 2,000 horsepower.

Carl Ilgner.

"Roll trains are classed in three categories, according to the manner in which the power for driving them is utilized: The classification is: 1. Reversing mills. 2. Trains always running in the same direction, but at a speed varying from time to time in the ratio of 3 to 2, while the slowest speed corresponds with the greatest absorption of power. 3. Those in which both power and speed are constant.

"For the first of these classes the gas engine is inapplicable, notwithstanding the attempts made at various works to introduce a reversible coupling between the fly wheel and the roll train. Electric driving affords excellent means not only for easily and certainly regulating the speed, but also for transforming the variable power required by the roll train into one that is almost uniform, in which case there is no doubt of the success of electric driving. Several electric roll trains are under construction, and the preliminary trials hold out the hope of thorough success.

"If a roll train, the speed of which varies periodically, be coupled with a gas engine, the latter will furnish the greatest amount of power when the speed is lowest. But the products rolled at this slight speed constitute only a third of the whole output, while the remaining two-thirds will be rolled at the maximum speed of the gas engine, the efficiency of which will be very slight. It follows that the gas engine will give out a considerable portion of its power while consuming too much gas per horsepower-hour. By employing electricity as an intermediary, the variations of speed are transferred to it so that variation of the load on the motor is diminished. The consequence is that, notwithstanding loss in the electric transmission, and without regard to variation in the speed, gas engines that are no more powerful than those for driving the roll directly may be erected at the generating station.

"It is perfectly evident that reversing mills and cogging trains absorb a widely varying amount of power. Electric driving and centralizing the generation of energy present excellent means for regulating motive power, on the one hand by increasing the rotary masses in motion, to which are added those of the fly wheels at the generating station, and the other by distributing the shocks and the irregularities over the whole generating station. It is evident that the power thus required by the cogging rolls from the gas engines at the central station will be less than that which the rolls would absorb if each were driven directly by its own motor.

"As regards the third class—roll trains of constant speed, which are generally used for plates and small bars—variations of load are not considerable, and in their case electric driving does not afford any great advantage. If, however, it be required to drive roll trains of all three classes, there is no doubt that centralization of the power is preferable to the use of a gas engine for each separate roll train. And to the advantages already claimed for the electric driving of roll trains in classes 1 and 2 must be added those resulting from centralization of the power. The total power absorbed by all the roll trains at a given moment is undoubtedly far less than the sum of the maximum power required by each train.

"Another advantage is that the motor of the generating station can receive all the care it requires, because one can be kept in reserve. If the gas engine be coupled directly with the roll train, the stoppages required for overhauling will not be compatible with the proper working of the train. The electric motor stands overloading better than does the gas engine, while it can be replaced by another of greater power more easily and at less expense. The provision of a reserve for meeting hitches at the blast furnaces or coke ovens is easier at a central station than for each motor.

"In short, a whole series of weighty considerations counts in favor of centralization. If it be considered that at the central station much less power plant will need to be laid down, while larger motors may be employed, and if again the connections of each train and the long gas pipes be considered, the conclusion is warranted that the first cost will not be an obstacle to adopting the principle of central electric stations. The difficulties encountered in the progressive transformation of works must not be disregarded, but it appears undeniable that centralizing the motive power of rolling mills, with electric driving and the use of blast-furnace or coke-oven gas, gives promise of great economy as compared with present practice."

Lake Champlain Ores.—Witherbee, Sherman & Co., Inc., in a booklet just issued presents ample analyses of their Lake Champlain ores, of which their mines have an annual producing capacity in excess of 1,000,000 tons. The ores listed include not only those of this company but also the output of the mines and separating plant of the Cheever Iron Ore Co., Port Henry, N. Y., and of the "21" group of mines belonging to the Port Henry Iron Ore Co., for both of which they act as sales agents. An interesting feature of this booklet consists of views of several buildings at Port Henry constructed of concrete made from tailings produced in the separation of the Harmony ore. The workingmen's houses constructed of this material have been planned with particular care, and further provision for the comfort of employes is found in the workingmen's club at Mineville, N. Y.

To Prevent Accidents.—Of interest in connection with the movement for the prevention of industrial accidents, for the better housing of the working classes and for other allied reforms is the International Exhibit of Railways and Land Transport to be held at Buenos Ayres, May 25 to Nov. 25, 1910. Hon. Alberto Schneiderwind, director general of the Argentine railroads, is president of the exposition, and announces that reservations for space must be made prior to June 15, 1909. One entire section will be devoted to "hygiene and sanitary assistance in land transportation" and another to the general subject of welfare work among railway employes.

THE ELECTRIC FURNACE REDUCTION OF IRON ORE[1]

By Joseph W. Richards.[2]

In order that one can understand thoroughly the problems arising in the reduction of iron ore by carbon in an electrically heated furnace, he should first of all have a clear idea of how this reduction proceeds in an ordinary, non-electrical blast furnace.

Blast Furnace Practice.

The iron ore contains iron oxide, with silica and clay as usual impurities, and more or less moisture; its phosphorus content may be low or high, but its sulphur content must be low, not over 0.5 per cent. If the ore carries over 1 per cent of sulphur it is given a preliminary roasting. In the furnace perhaps 99 per cent of the iron oxide is reduced to metallic iron, 10 to 20 per cent of the silica is reduced by carbon to silicon, which combines with the iron, all of the phosphorus is reduced into the pig iron, and a varying proportion of the sulphur, this proportion being smaller the more basic the slag is made with lime and the higher the running temperature.

Flux is added to make fusible slag by combining with the unreduced silica and the clay in the ore. Limestone, unburnt, is the usual flux, but magnesian limestone, carrying $MgCO_3$, is quite commonly used, the magnesia increasing the fusibility of the slag if not in greater proportion to the lime than the proportions 2CaO.MgO. The amount of flux added is variable, it depends on how basic the slag must be made. If the fuel is coke, and therefore considerable sulphur comes into the furnace, the slag formed must be nearly half lime and magnesia, to make low sulphur pig iron; if the fuel is charcoal, carrying almost no sulphur, and the ores carry none, the slag may be only one-third lime and magnesia and two-thirds silica and alumina, and make best quality pig iron. Such slag costs less for flux and is more fusible than the basic lime slags.

Fuel is needed to provide heat and reducing effect. The heating effect is almost entirely produced by the combustion of the larger part of the fixed carbon (non-volatile carbon) of the fuel to carbon monoxide (CO) before the tuyeres. This combustion fills two functions: It provides the high temperature necessary to melt down the iron and slag, and it provides large quantities of reducing gas, practically identical in composition with producer gas (30 to 35 per cent CO, 1 to 2 per cent H_2, rest N_2), which does in the upper part of the furnace the larger part of the reduction performed in the furnace.

The amount of fuel used in a blast furnace is determined by the amount which must be burned at the tuyeres to produce the necessary smelting temperature, and not by the amount necessary to perform the reduction of the metallic oxides. The amount necessary for performing the reductions taking place in the furnace is only one-third to one-half of the amount necessary to be burned to provide the smelting heat. That this statement is true of the ordinary blast furnace may be seen from the fact that if the smelting zone is increased in temperature by heating the blast, the amount of carbon used in the furnace per unit of pig iron made is at once decreased. Or, if the heat available in the smelting zone is increased by drying the blast, and thus removing the strong cooling influence which the decomposition of the moisture of the blast exerts, economy of fuel at once results. In fact, any means of getting high smelting temperature without combustion of carbon before the tuyeres, decreases at once the quantity of fuel necessary to use in the furnace, since the quantity used is determined by the heat requirements in the smelting zone and not by the requirements for reduction, which are only a fraction of the former.

The ash of the fuel is largely silica, with some alumina and lime, if coke, or alkalies, if it is charcoal. This requires flux to slag it, an amount which may be considerable when using poor coke high in ash. Regard for this item of cost should be had in purchasing or valuing the fuel.

The pig iron produced contains carbon between 2.5 and 4.5 per cent, silicon in varying quantity, 1 to 4 per cent, according to the temperature and rate of running of the furnace, practically all the phosphorus of the charge, and one-tenth to one-fourth of the sulphur. Its melting point is about 1,200 degrees C., and it runs from the furnace ordinarily at 1,500 degrees to 1,600 degrees C., carrying out as sensible heat 250 to 300 calories.

The slag may be basic or acid, as before explained, and these varieties will average in per cents:

	BASIC SLAG. High Sulphur Charge.	ACID SLAG. Low Sulphur Charge.
SiO_2	35	55
Al_2O_3	10	10
CaO	40	25
MgO	10	5

These slags melt at about 1,350 degrees and 1,200 degrees C. respectively, and ordinarily run away from the furnace at 1,600 degrees C., carrying out as sensible heat 500 calories.

The reduction of silica and phosphorus oxide in the furnace is accomplished by solid carbon in the smelting zone. A small part (10 to 20 per cent) of the iron oxide in the furnace is also similarly reduced by fixed carbon; the rest is reduced in the upper half of the furnace by the excess of carbon monoxide gas. So much of the latter gas, however, is produced before the tuyeres in generating the temperature necessary in the smelting zone, that only a fraction of it is converted into carbon dioxide, CO_2, in reducing the iron oxides of the charge. This is the chief reason for the excess of unused carbon monoxide in the gases of the blast furnace, an amount whose potential calorific value often represents one-half of the calorific power of the fuel put into the furnace. It is true that all the carbon monoxide in the gases could not be utilized no matter how small its amount, but that is a limit set by the principle of chemical equilibrium or mass action, which ordinarily is not approached because of the excessive amount of carbon monoxide produced in the lower part of the furnace in the effort to get the requisite smelting heat and temperature. The proportions of carbon ordinarily consumed at the tuyeres are 9 atoms (108 parts) of carbon for each molecule of iron oxide (160 parts) reduced by the carbon monoxide gas. The chemical equation is: $Fe_2O_3 + 9CO = 2Fe + 3CO_2 + 6CO$. This equation shows us that only one-third of the carbon monoxide produced before the tuyeres, in generating the smelting temperature, is utilized in reduction, while two-thirds escapes unused.

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[1]A paper presented at the fifteenth general meeting of the American Electrochemical Society, at Niagara Falls, Canada, May 6-8, 1909.

[2]Professor of metallurgy, Lehigh University, South Bethlehem, Pa.

Electric Smelting Furnace.

Passing to the electric principle of smelting, we have here to deal with the case of all necessary heat supplied by electrical energy, no blast blown in, and therefore all the solid carbon utilized for reduction (always excepting the small amount which dissolves in the pig iron). In calculating the amount of carbon necessary to thus reduce the iron oxide, we meet at the outset with this difficulty: What proportion of the carbon will form CO_2 and what proportion CO? We know that when reduction takes place at a very high temperature, CO is almost the only product; but as this passes more or less slowly through the cooler portions of unreduced charge, CO_2 is formed in increasing amounts, until at a low red heat, given sufficient time, about half the CO may be converted into CO_2. The formulas corresponding to these two extremes are:

$$Fe_2O_3 + 3C = Fe_2 + 3CO.$$
$$Fe_2O_3 + 2C = Fe_2 + CO + CO_2.$$

Comparing these with the ordinary blast furnace reaction, which requires 9C put into the furnace for the reduction of Fe_2O_3, we see that 3C, or one-third as much carbon, is the greatest amount necessary in the electric furnace reduction, and 2C, or between one-third and one-fifth as much, is the smallest amount necessary. As will be further shown, the uncertainty as to how much CO_2 can be formed in the electric furnace reduction is perhaps the chief difficulty in running the electric furnace.

Example.—Iron ore is to be reduced to pig iron in an electric furnace, and the flux and charcoal on hand for the charge analyze as follows:

Iron Ore.		Limestone.		Charcoal.	
Fe^2O^3	90	$CaCo^3$	90	Fixed C	90
SiO^2	8	$MgCO^3$	8	Volatile Mt'r.	6
Al^2O^3	2	SiO^2	2	SiO^2	2
				Al^2O^3	1
				K^2O, Na^2O	1

Assume the pig iron made will contain 4 per cent of carbon and 3 per cent of silicon; that the slag may be 65 per cent. SiO_2 plus Al_2O_3; that the gases contain only the CO_2 from the limestone, and none from the reductions.

Required: (1) The weights of ore, limestone and charcoal to charge per 100 of pig iron made. (2) The percentage composition of the gases. (3) The weight and percentage composition of the slag.

Solution: (1) The weight of ore needed is that necessary to supply the 93 parts (100-4-3) of iron in the pig iron. This will require 93 × — = 133 parts of Fe_2O_3, which will be contained in 133 ÷ 0.90 = 148 parts of ore.

The weight of charcoal needed is that necessary to furnish enough fixed carbon to reduce the iron oxide and that silica which is reduced, and to supply the carbon in the pig iron. These quantities are:

Reduction of Fe^2O^3: 93 × 36/112 =	29.9
Reduction of SiO^2: 3 × 24/28 =	2.6
For carbon dissolved: ..... =	4.0
Total requirement ..... =	36.5
Charcoal required 36.5/0.90 ..... =	40.6

The weight of flux required is best found by calling it x, and then figuring out the slag, as follows:

Silica in the slag will be that in the ore, flux and fuel, minus that reduced to silicon. Therefore,

In ore .....148 × 0.08 =	11.8
In flux ..... x × 0.02 =	0.02 x
In fuel .....40.6 × 0.02 =	0.8
Reduced .... 3 × 60/28 =	6.4
Silica in slag..... =	6.2 + 0.02 x

By similar calculations we find the slag to contain, as a whole:

Silica	6.2 + 0.02 x
Alumina	3.4
Lime	0.50 x
Magnesia	0.04 x
Alkalies	0.4
Total weight	10.0 + 0.56 x

If the slag is to be 65 per cent of silica and alumina together, then

$$0.65\ (10.0 + 0.65x) = 9.6 + 0.02x$$

from which $x = 9$.

The above solution is perfectly general, and applies to all kinds of ore, flux and fuel, and the production of any desired kind of slag.

(2) The gases will contain the fixed carbon of the charcoal (except that part which goes into the pig iron) in the state of CO, the carbonic acid driven off the flux, and the volatile matter from the charcoal. The latter may be assumed as composed of equal parts by volume of hydrogen, carbon monoxide, and carbon dioxide, which would correspond to weights of those gases in the proportion of 2:28:44. The gases passing off will therefore be, in parts by weight:

CO from fixed carbon	32.5 × 28/12 =	75.8	
CO from volatile matter	2.7 × 28/74 =	1.0	76.8
CO^2 from volatile matter	2.7 × 44/74 =	1.6	
CO^2 from flux	9.0 × 0.44 =	4.0	5.6
H^2 from volatile matter	2.7 × 2/74 =	0.1	0.1
Total weight of gases			82.5

Percentage composition of gases by volume:

		Percent.
CO	76.8 ÷ 1.26 = 61.0	= 92.4
CO^2	5.6 ÷ 1.98 = 2.8	= 4.2
H^2	0.1 ÷ 0.09 = 2.2	= 3.4
	66.0	100.0

The volumes 61.3, 2.7 and 2.2 represent cubic meters of these gases per 100 kilograms of pig iron made; if multiplied by 16 they give the cubic feet per 100 pounds of pig iron.

(3) The slag will contain, substituting x = 9:

		Percent.
Silica	6.4	= 42.4
Alumina	3.4	= 22.5
Lime	4.5	= 29.8
Magnesia	0.4	= 2.65
Alkalies	0.4	= 2.65
	15.1	100.00

Combined Blast and Electrical Furnace.

The electrical reduction of iron ore differs radically from blast furnace practice in one essential particular, viz., that since no air is blown in, any excess of carbon above that consumed in reduction must remain unused, accumulate, and eventually clog the furnace. The amount to be used as a minimum cannot, moreover, be calculated until we know how much CO_2 will be formed in reduction, and that is an unknown quantity unless arrangements are made so that none can be formed. The following modifications of working an electrical pig iron furnace are possible, with the object in view of avoiding the accumulation of excess carbon in the crucible.

(1) A deficit of carbon may be put into the charge, thus permitting unreduced iron oxide to escape in the slag, and preventing unused carbon from accumulating. This solution leads to the disadvantages of loss of iron, heavy corrosion of lining of furnace, and heavy consumption of electrode carbon. It may have the secondary result of preventing reduction of silica or taking up of carbon by the iron, and thus furnish a metal with high melting point and approaching steel in composition. Such slag would also remove some of the phosphorus in the charge, but practically no sulphur.

(2) A charge of ore and flux with-

out fuel may be run through the furnace whenever an accumulation of carbon occurs, as is shown by the resistance of the furnace falling off and the furnace getting cold. This was the device adopted in the experiments of the Canadian commission at Sault Ste. Marie, but while permissible in experimental work, it would not do to thus periodically derange a furnace in regular running.

(3) The fuel may be calculated only for the production of CO in the furnace, and this condition approximated by leading off the gases from the hot part of the furnace and not allowing them to cool in contact with the ore. In this way reduction by CO is avoided, and the fixed carbon in the charge may be consumed almost entirely to CO without formation of CO_2. This would bring the furnace consumption of carbon nearer to a definite amount, and by avoiding reduction except by solid carbon tend to use up all the carbon charged, the amount of which would be calculated by this manner of working (as in the numerical example worked out for illustration).

It may be quite possible, by some such device as Mr. Taylor's large electrical furnace, to practically combine the blast furnace and the electrical furnace. The writer is quite confident that any practical method of introducing electrical heat into the crucible of a blast furnace will result in large economies in the furnace working. Only one-quarter of the heating power of the fuel is developed around the blast tuyeres, and yet if half of this could be replaced by electrically generated heat, an economy of 50 per cent could in all probability be reached upon the fuel bill. To put it into figures, it takes 1.2 tons of coke to make a ton of pig iron in the blast furnace, and about three-quarters of a ton is burnt by the blast, producing at the smelting zone about 25 per cent of the calorific power of the coke. If electrical energy could be made to supply one-half of this, the furnace would make iron with half the previous coke supply, that is, with 0.6 ton of coke per ton of pig iron, and this with an expenditure of electrical energy equal to 12.5 per cent of the calorific power of the coke, that is, equal to the calorific power of but 0.15 tons of coke.

CHARGE SHEET—Per 100 of Pig Iron Produced.

Charges.		Pig Iron.		Slag.		Gases.	
Ore:	(148.0)						
Fe^2O^3	133.2	Fe	93.0			O	40.2
SiO^2	11.8	Si	3.0	SiO^2	5.4	O	3.4
Al^2O^3	3.0			Al^2O^3	3.0		
Limestone:	(9.0)						
CaO	4.5			CaO	4.5		
MgO	0.4			MgO	0.4		
SiO^2	0.2			SiO^2	0.2		
CO^2	4.0					CO^2	4.0
Charcoal:	(40.6)						
Fx'd C	36.5	C	4.0			C	32.5
CO	1.0					CO	1.0
CO^2	1.6					CO^2	1.6
H^2	0.1					H^2	0.1
SiO^2	0.8			SiO^2	0.8		
Al^2O^3	0.4			Al^2O^3	0.4		
$(NaK)^2O$	0.4			$(NaK)^2O$	0.4		
Totals	197.9		100.0		15.1		82.8

(4) The best solution of this difficulty may be to provide tuyeres by which air can be sent into the crucible of the furnace, and thus burn any accumulation of carbon. A given quantity of air will always burn a given quantity of carbon, and therefore the cure would seem to lie in having a variable supply of air, which is increased whenever the falling resistance of the furnace indicates that carbon is beginning to accumulate, and diminished to a small minimum supply, only enough to keep the tuyeres open, when the furnace is in good electrical running order. It would represent a combined electrical and blast furnace, with the blast so regulated as to overcome the chief difficulty of the purely electrical furnace—the accumulation of unused carbon in the crucible.

The question of economy in this case will not be, then, the simple replacement of fuel heat energy by an equivalent amount of electrical heat energy, but the comparison of fuel heat energy with the cost of one-fourth its amount of electrical heat energy. This may be quite possible in many localities, and the combined furnace would work more regularly than a purely electrical furnace. The question awaits the coming of the electro-metallurgical engineer who can make practicable the requisite combination. A possible solution may be to use cheap electrical power to super-heat the hot blast, and thus to make the blast itself the agent for carrying electrically developed heat into the furnace.

MAY MEETING

Of the American Society of Mechanical Engineers.

About 300 members attended the spring meeting of the society, held in Washington, D. C., on May 5, 6 and 7. The ladies and guests numbered about 250.

The first professional session of Wednesday morning was devoted to the following papers: "A Unique Belt Conveyor," by Ellis C. Soper, Detroit; "Automatic Feeders for Handling Material in Bulk," by C. Kemble Baldwin, Chicago; "A New Transmission Dynamometer," by Prof. Wm. H. Kenerson, Providence; "Polishing Metals for Examination with the Microscope," by Albert Kingsbury, Pittsburg.

Mr. Soper's paper contained a description of the installation and operation of a belt conveyor, a quarter of a mile long, requiring less power to operate when empty than when loaded, because of the material being conveyed down hill, so that the only labor required in operation was that of a boy to oil and adjust the rolls.

Mr. Baldwin's paper was prepared to enable an engineer to choose, from a number of different types of feeders, the one best fitted to his use, and included line drawings for ready comparison and pointed out that when feeding a conveyor or crusher from a storage bin the advisability of some type of automatic feeder, which should be geared to the machine being fed, so that they would not only start and stop simultaneously but the relative rates of speed would be constant.

Prof. Kenerson's paper described a new dynamometer constructed in the form of a shaft coupling which we hope to reproduce in a later issue.

Mr. Kingsbury's paper on polishing metals gave, in considerable detail, a method developed by the author and used for some years with very satisfactory results. There was almost no discussion on any of the papers and the session was brought to an early close.

In the afternoon the party visited Fort Meyer and witnessed an exhibition drill by the Field Artillery stationed at the post, which was thoroughly appreciated.

Thursday, May 6.

The morning session was brief, and was devoted to papers on "Marine Producer Gas Power," by C. Lee Straub, New York; "Operation of a Small Producer Gas-Power Plant," by C. W. Obert, New York; "A Method

of Improving the Efficiency of Gas Engines," by Thos. E. Butterfield, Philadelphia; and "Offsetting Cylinders in Single-Acting Engines," by Prof. T. M. Phetteplace, Providence.

Mr. Straub's paper was very complete and dealt with the substitution of producer gas power for steam at sea, and gave comparative weight, space occupied, etc., in a representative cargo ship, for which he selected one of the type of bulk freighter so highly developed on the great lakes. The figures went to show that the space occupied by the gas plant is about 30 per cent less than for steam, and the weight reduction 50 per cent, and the fuel cost may confidently be looked for to be cut practically in two. Mr. Straub also traced the development of marine gas power in Europe and America and gave a list of the principal examples. Different types of producers were also compared, and these, together with plans of the ship referred to, showing the steam and gas plants installed, were illustrated by slides. Because of lack of time the discussion was cut short and was participated in by Messrs. Holmes, Moultroup, Adams, Penton and Wilson. Mr. Butterfield's paper has already been printed in full in THE IRON TRADE REVIEW of April 15, 1909. There was practically no discussion on any of the other papers.

Thursday afternoon the party was received by the President, and on Thursday evening they were addressed by Rear Admiral George W. Melville, U. S. N., Retired, on "The Engineer in the Navy." Admiral Melville was, for many years, chief of the bureau of steam engineering, and besides having been active in the building of the new navy, has an intensely interesting personal history. Later, Walter M. McFarland, vice president of the Westinghouse Electric Co., Pittsburg, delivered an address on "Rear Admiral Melville's Services to the Engineering Profession and to the Nation," followed by the presentation of a wonderfully well executed life size portrait of the admiral to the National Gallery, and which was accepted by Director Walcott, representing the nation. Mr. McFarland paid a high tribute to Admiral Melville from the standpoint of one who was, for a number of years, closely identified with him in the navy, much of the time as his assistant in the bureau at Washington.

Friday, May 7.

The morning session, like those preceding, was somewhat hurried. The papers presented were: "Small Steam Turbines," by George A. Orrok, New York; "Tests on Compressed-Air Pumping Systems for Oil Wells," by Edmund M. Ivens, New Orleans; "Specific Volume of Saturated Steam," by Prof. C. H. Peabody, Boston; "Some Properties of Steam," by Prof. R. C. H. Heck, New Brunswick, N. J.; and "A New Departure in Flexible Staybolts," by H. V. Wille, Philadelphia. In addition, there was a continuation of the discussion on "Safety Valves," continued from the February meeting.

Mr. Orrok's paper dealt with the subject of small steam turbines from the standpoint of the designing and operating engineer, and illustrated the various types now on the market by means of sections and photographs, together with a number of curves showing the steam consumption which may be expected from the machines under certain conditions.

Mr. Ivens' paper on "Compressed-Air Pumping Systems" describes briefly the compressed-air plants used in the Louisiana oil fields, together with a series of tests showing cost of operation, efficiency, etc., of the old and new systems.

The discussion of Mr. Orrok's paper gave promise of animation, as did that on "Safety Valves," but was practically cut off by the president's insistence on haste. Messrs. Rice, Ford and Howard participated in the discussion on turbines, and Messrs. Musgrave, Darling and Carhartt in that on "Safety Valves." The other papers were read by title only, and there was no discussion.

Friday afternoon the party visited Mt. Vernon, concluding the program.

Artisans' Summer School.—The ninth session of the summer school for artisans of the University of Wisconsin will begin June 28, continuing for six weeks. Courses are offered in steam and gas engine construction, electricity, machine design, mechanical drawing and allied subjects. There are no entrance requirements, the purpose of this school being to offer practical instruction by lectures and laboratory practice to young men in the trades. Certain advanced engineering courses are offered for those having the requisite preparation. A new feature of the coming session will be courses in public utilities testing and accounting. Information may be obtained from P. E. Turneaure, Dean, College of Engineering, University of Wisconsin, Madison, Wis.

THE PRESENT VALUE OF ELECTRICAL STRUCTURAL STEEL.[1]

By HENRY D. HIBBARD.

Sometimes it happens that claims are made for a new thing of genuine merit so extravagant that when it falls short of fulfilling them all it meets trouble, opposition and delay in securing the recognition to which it is fairly entitled for the uses for which it is well adapted.

It is possible that the electric smelting of steel, now entering the commercial stage, is in danger of having its progress retarded by the zeal of its friends, who may claim more for it in some respects than the future will justify, and it therefore may be well to consider, from the standpoint of established steel metallurgy, what improvements may be reasonably expected from electric steel melting that will give it place in the face of competing processes, and what they are worth. However interesting it is from a scientific point of view, electric steel melting must prove profitable to those conducting it as a business or it will cease to interest a society like this, whose aims are in the field of applied science.

What follows is intended chiefly to compare the value of electric steel with that of steel made by the Bessemer and open hearth processes. Comparison with crucible steel is less needed because the differences are less.

The advantages which electric steel melting offers may in a general way be said to consist in the ability to melt or to retain melted a large quantity of steel in an environment either non-oxidizing or with access of oxygen to the metal under control, and also with controllable heat in the metal, both as to degree and duration. The beneficial result of these advantages lies more in the direction of improved qualities in the product that in lessening its cost.

As a result of these great determining factors the specific points resulting which tend to improve the product are the elimination of oxidation products, of the phosphorus and the sulphur, and, by the removal of these from the steel, to improve its quality and, when desired, to permit of less manganese being present in the finished metal. We will consider them in detail.

Oxidation Products.

These are the most uncertain of all the poisons to steel, because they are

[1] A paper presented at the Fifteenth General Meeting of the American Electrochemical Society at Niagara Falls, Can., May 6-8, 1909.

not determined and are dealt with by indirect methods. They may be itemized as being chiefly oxides of iron, manganese, silicon and carbon, and silicates of the two metals mentioned. Other oxides, silicates or gases are no doubt often present, but in very small quantities, except perhaps in the so-called alloy steels, but are not here considered.

The usual analysis does not reveal the presence or amount of these oxidation products. There is no method for the determination of oxygen suitable for regular work, and the usual determination of silicon gives no clue to its state in the metal, as to whether it is there as a silicide, silicic acid, or silicates, the latter two forms being those in which it is very harmful.

The electric furnace, by melting the stock in a non-oxidizing environment, either prevents the formation of such amounts of oxidation products as are usual in molten low-carbon iron produced by the pneumatic or open hearth processes, or, by keeping in a molten state such metal, however prepared, with some reducing element present, usually carbon or silicon, causes the elimination from it of such amounts as it may contain.

The actual benefit conferred on steel by the removal of the oxidation products cannot be set down in figures because of the lack of quantitative determinations of their amounts when present. On the usually determined physical properties they work harm, and they increase the susceptibility of the steel to corrosion. The great trouble they cause, however, comes in hot working the steel while it is still in the hands of the makers, from unsoundness in the ingot and redshortness, and also as surface blemishes of various kinds, such as checks, seams, un-uniform color, scale sticking irregularly and the like in the finished steel.

In rail steel ingots now being investigated at Watertown arsenal, polished sections show with a good magnifying glass the presence of little shot of foreign matter, such as are more or less common in varying degrees in the ordinary grades of open hearth and Bessemer steel. These have been thought to consist of sulphide of manganese, but there is considerable evidence going to show that they consist, in large part at least, of the above mentioned oxidation products. They are rather small to collect for quantitative analysis, but their behavior with various reagents may yet determine their composition. There are two conceivable ways in which such shot may be present within the mass of the metal. One is that they are formed within the metal from the aggregation of oxidation products, and the other that they are mechanically mixed with the metal by violent mixing, especially that due to casting the steel, as oil and water may be mixed by such means if sufficiently rapid and prolonged. A third case is also possible, in which they are due in part to each of the causes given. The first case is probably the real one, but the fact cannot be considered proven as yet.

In the first case their composition will be that of the oxidation products plus, perhaps, some manganese sulphide, either intermixed or existing separately, though it may be in the same shot, and some manganese oxide, the manganese of these being a part of that in the final additions.

In the second case they will have the composition of the slag plus what oxides and sulphides they may have absorbed from the metal and final additions.

Assuming that these shot are due to the first mentioned cause, which apparently they must be at least in large part, the oxidation products which enter into them when first formed are practically dissolved in the metal, or at least are so finely disseminated as to be invisible. They do not collect into drops or shot until they are in a state of fusion, either because the heat has risen to their fusion temperature, or because that temperature has been lowered by fluxing with each other and with the oxide of manganese formed from the manganese in the final additions.

In the Watertown ingots examined, the metal within, where it had remained molten about fifteen minutes longer than at the surface, showed but a fraction as many shot per unit of area as the steel near the exterior. This indicates strongly that time is very beneficial and indeed essential in removing such entrained particles.

Just what effect stirring has or would have on the steel before it solidifies is somewhat a matter of conjecture. It would seem that gentle stirring, by making the minute shot touch and amalgamate with each other, would help, for the larger shot so formed would be more effectively floated to the top by gravity. Violent stirring, on the other hand, might break up the shot into smaller ones, and so prevent their separation from the metal.

The electric furnace, then, in dealing with the oxidation products in crude steel enables the fusion to be continued at will until they are removed as completely as desired through agglomeration and gravitation, or by their reduction to elements through the action of some reducing element at the high temperature maintained.

Another matter, however, comes in here for consideration. If steel containing less of the oxidation products than is usual be found to have for that reason increased commercial value, something can be done when using the Bessemer and open hearth processes to attain some of that value, especially with the latter. In the Bessemer process the means to that end may perhaps be limited to variations in stock, blowing and final additions, followed by a limited and gentle stirring. In the open-hearth process the time may be prolonged equally with the electric. Then by proper treatment of the slag and bath, and by allowing enough time, the oxidation products may be eliminated very largely—so much so as to approximate even electric steel in that respect.

If the electric steel furnace induces consumers to pay for high quality it will indeed have justified its existence. Until then its value because of its ability to eliminate oxidation products must be held as not determined.

Phosphorus.

The basic open hearth can now produce regularly from very ordinary materials steel so free from phosphorus that very little is left for the electric furnace to do even if it were possible by its use to remove every atom. Given two steels substantially alike in other respects, but having respectively 0.01 and 0.02 per cent of phosphorus, and he would be bold who would claim to be able to show a measurable difference in value for any purpose between them due to that fact. The elimination of an additional hundredth of a per cent seems to have more of a sentimental than a commercial value. Before the days of basic linings, phosphorus was the great enemy of the steel maker—an enemy who held every inch of ground without loss, and whose position seemed impregnable. Now, though pretty well cowed, it seems as if fear that it might in some way again be a menace to quality, leads us to attach undue importance to its absolute extinction.

The value then of the ability of the electric furnace to make structural steel exceedingly low in phosphorus cannot be great from a commercial point of view.

Sulphur.

The effect of sulphur on the physical properties of the finished steel is so slight that satisfactory reasons do not appear for closely limiting and

specifying its permissible content. As in the case of the oxidation products, the trouble from sulphur is more in evidence during manufacture than in the finished steel. The power of the electric furnace to eliminate sulphur from steel, while undeniable, must be held nevertheless as of little real value until the minimum attainable in the open hearth process is shown to have an important detrimental effect on the product.

Further claims may be made of other advantages and of certain beneficial effects akin to electrolytic action on the charge in the electric steel furnace, but be they well founded or not, it must be indubitably shown that the properties of the finished steel are better than those given by other methods at about the same or lower cost before the electric furnace can take its place as one of the standard commercial means for producing or finishing structural steel.

Conclusion.

It is stated that the German government is paying $4 a ton more for rails rolled from electric steel than for ordinary rails. Such action might be for either of two reasons: First, that the electric steel rails have been demonstrated to be worth that additional price; or, second, that the $4 amounts in part at least to a government subsidy aimed to put forward the development of the electric furnace. As the final test of value of a rail consists in wearing it out by actual service, which can hardly have been done yet, it would seem fair to assume at this time that the $4 includes a subsidy. The total amount of such subsidy can not be very large up to date.

Protecting Workmen.—The United States Steel Corporation has organized a safety committee, consisting of 20 experts, whose business it is to examine their various plants with a view to making suggestions for safe-guarding machines or processes. The Museum of Safety and Sanitation is informed that monthly conferences of the sub-committees are held, and once a year a meeting of all together. Their recommendations have been followed, and last year the Corporation spent $55,000, in accordance with their reports, to make life and limb safer.

Announcement is made that B. Nicoll & Co., 149 Broadway, New York, have been appointed general sales agents of the Pittsburg Terminal Railroad & Coal Co., operating the West Side Belt lines in the Pittsburg district.

MEETING OF THE ELECTRO-CHEMICAL SOCIETY.

The fifteenth general meeting of the American Electro-Chemical Society was held at Niagara Falls, Canada, May 6, 7 and 8. The meeting place was at the Clifton hotel, directly opposite the Canadian and American falls. The whole of the first day was given up to papers and discussion of the application of the electric furnace to the reduction of iron ores and the manufacture and refining of steel.

One of the most interesting papers was the first one on the program by Dr. Haanel, of the commission of the Canadian government for the study of electric smelting of iron. The paper was a description of a 12-day run of an electric furnace for the direct production of pig iron from iron ore in Ludvika, Sweden, conducted by the Electrometals Co. The furnace is a combination of a vertical shaft similar to a small blast furnace, directly superimposed upon and opening into a large refining chamber. The current used was three-phase and the three large electrodes were placed in the lower chamber. The reducing agent was charcoal, the consumption of this being 605 pounds per long ton of iron made. The consumption of electrodes was stated to be about 11 pounds of carbon per long ton of iron. The power consumed was equivalent to a production per electrical horsepower year of 0.744 to 3.16 metric tons of iron.

The advantages of the process were summed up as follows: (1) The electrodes required little attention, in one part of the run going for five days with no change; (2) the energy of consumption was practically uniform; (3) the descent of the charge in the main shaft was steady and the charge in the lower refining furnace maintained its relative position; (4) the charge did not stick or jam at the throat, or at the narrow part of the shaft and needed no poking. This was in contrast to the results obtained with the experiments conducted at the Soo, where, the author stated, one of the serious troubles was the fact that the ore at the throat became sticky, due to the heat of the burning gases at this point; (5) the lining of the roof of the lower chamber seemed in no way injured or deteriorated by the 12-days' run.

The Heroult Pig Iron Furnace.

The second paper of the morning, by P. McC. Bennie, consulting metallurgist of Niagara Falls, was an account of the design, building and operation of an Heroult electric furnace for the direct production of pig iron from iron ore at Heroult, in Shasta county, California, by the Noble Electric Steel Co. The first furnace was designed to use 1,500-kilowatt current. Unforeseen difficulties caused the abandonment of this equipment after a short run. A furnace of 160-kilowatt capacity was then built for experimental purposes and operated for 40 days. With this it was proved that four tons of pig iron per electrical horsepower-year could be made, with the consumption of 1 1/3 ton of charcoal and at a total cost of $15 per ton. With the experience gained in the operation of this small furnace, a new 1,500-kilowatt, three-phase furnace was designed and is now ready for operation.

The conditions for the success of this enterprise are especially favorable at this locality. Near the furnace plant is a large body of magnetic iron ore carrying an average of 69.7 per cent of iron, 2.46 per cent of silica, 0.011 per cent phosphorus, and 0.009 per cent of sulphur. Accompanying this deposit of iron ore is a layer of excellent limestone for fluxing purposes. Both ore and limestone are mined from an open pit. The market price of pig iron on the Pacific coast is from $9 to $10 higher than in Pittsburg. The company is now planning and is about to start the construction of a by-product charcoal plant to cost about $50,000, in which the charcoal necessary for the reduction of the ore will be made, and the by-products, calcium acetate, wood alcohol, etc., will be worked up into marketable purity.

Keller's Investigations.

A paper by Ch. A. Keller, general manager "Societe des Establissments Keller-Leleux," Livet, Isere, France, was then read by Mr. Bennie, Mr. Keller not being present at the meeting. The paper first discussed briefly the history of Mr. Keller's researches on the direct production of iron. His early furnaces were built with the positive electrodes through the top of the furnace and the negative pole connected by metallic conductors through the bottom of the furnace. An illustration was shown of such a stationary furnace built in 1899, wherein the negative electrode was composed of a large number of vertical, rectangular iron bars connected at the bottom with a copper conductor and ending at the top flush with the bed of the furnace. The latter was made of pure magnesia, stamped in around the iron bars. The newer furnaces of Keller

have abandoned this method of construction, the current being led both in and out through electrodes in the top of the furnace, and being built so that the metal can be poured out by tipping the furnace. The latest one built has a capacity of 20 tons, requiring 1,800-kilowatt, three-phase current, and is capable of working 10 charges daily when being used as a refining furnace for open-hearth or Thomas steel. The sulphur in these charges is easily reduced to, or below, 0.02 per cent.

Paul Girod's Paper.

A paper by Paul Girod, director "S. A. Electrometallurgique Procedes Girod," Ugine, Savoie, France, was read by the secretary, Mr. Girod not being present at the meeting. The paper included a general discussion of the advantages of the electric furnace for the melting and refining of steel, and emphasized his opinion that steel made by running the molten metal directly from the open-hearth or Thomas furnace into the electric furnace for refining, was inferior in quality to that made wholly in the electric furnace, or by melting and refining cold steel in the electric furnace. Steel made directly from molten metal was found to be inferior in both hardness, strength and durability, and the author ascribed this inferiority to the occluded gases, possibly oxygen, nitrogen or hydrogen, which molten metal was supposed to contain in the open-hearth and Bessemer furnaces. He thought, if such metal was to be refined in the electric furnace, it is better to let it solidify first, thus allowing the occluded gases to be removed, and was of the opinion that the cost of remelting was more than gained in the superior quality of the steel so made. He did not think it possible to make fine tool steel in the electric furnace directly from molten open-hearth or Thomas steel.

This paper was discussed, among others, by the secretary, Prof. Richards, who had seen the Girod furnace in operation. It had one electrode connection through the furnace bottom, and this method of construction did not seem to offer any particular difficulties there. Mr. Matthews, of the Holcomb Steel Co., Syracuse, said that at first the electric furnace did not produce tool steel equal to that made from Swedish iron in crucibles, but that now a product fully equal was easily made. He thought that the main principles of the electric steel furnace had been satisfactorily worked out, and that inventors should from now on give their main attention to the perfection of the details of such furnaces.

The paper read by Prof. J. W. Richards, of Lehigh University, on "The Electric Furnace Reduction of Iron Ore," considered principally the reactions which occur in the present day blast furnace and the differences which these reactions undergo in electric furnace smelting of iron ores. He pointed out that a small portion only of the carbon consumed in the blast furnace was directly useful in reducing the ore and melting the iron, and stated that several times as much carbon was actually used in the blast furnace as was essential for direct reduction and smelting. In this respect, the electric smelting furnace would have the advantage, because a saving of one part of carbon in the reducing process would be equivalent to a saving of four or five parts over present blast furnace methods. The morning was concluded by a general discussion of these papers in which no particularly new point was brought out.

Essentials of Commercial Success.

The afternoon was opened with a few remarks by Mr. Simpson, who talked very interestingly of the conditions under which the electric furnace for the production of pig iron could be expected to become a commercial success. He said that the essential conditions were a locality where good ore could be had, where coal was expensive and water power cheap, and stated that all of these conditions were eminently present in Canada. He predicted a brilliant future for the electric processes in the iron industry, and said that the direct production of pig iron was already in operation in Norway, Sweden, India and California. He predicted that nickel steel would eventually be made directly from the ore by such a process. He was convinced that the day was not far distant when the cost of the electric production of pig iron would not exceed that of the cost of blast furnace pig iron in Pittsburg, and emphasized the fact that practically all spiegeleisen and ferro-manganese abroad was now made in electric furnaces, that the tool steel makers of Sheffield had already installed not one but six or seven electric furnaces for making tool steel, and that electric refining furnaces were used at the Krupp plant and in many other places on the continent.

A paper by Major Cav. Ernesto Stassano, director Forni Electrici Stassano, Turin, Italy, was read by the secretary, because the author, although present at the meeting, was not sufficiently familiar with speaking English. The first part of the paper was a historical discussion of the early application of electricity to the metallurgy of iron and steel in the three types of arc, resistance and induction furnaces. He gave Siemens and Moisan the credit of commencing experiments along this line as early as 1879, and mentioned the experiments of Cowles in 1886 and Wilson in 1892. He then described his present method of using the electric current for refining steel and the advantages of this furnace over the induction and other types of refining furnaces. The furnace that he advocates heats the metal by radiation from the electric arc, by which method a higher voltage and greater current density at the electrodes is possible. Major Stassano stated that, in making ordinary steel castings, one kilogram of steel could be produced by the expenditure of one kilowatt-hour of current.

Three Papers by Gustav Gin.

Three papers by Gustav Gin, electrometallurgist "Societe Procedes Gin," Paris, were the next on the program, and were read by F. A. FitzGerald. The first one described a new induction furnace for the melting and refining of steel, designed to get better uniformity of product and better circulation in the furnace than is attainable in present practice. The design includes two rectangular wells, connected at two points by troughs, the whole constituting a circuit for the induced current. The two connecting troughs are inclined slightly in opposite directions to promote the flow of metal. Since the slag in present induction furnaces has a lower temperature than the metal which it covers, the new furnace includes two electrodes in each of the wells for heating the slag. The paper includes the design of such a furnace for the use of a 6,000-kilowatt current, which has not yet been built.

The second paper was a mathematical discussion of the data obtained in the operation of the 400-kilowatt furnace at the Krupp plant, using a five-frequency current of a 790-kilowatt furnace in Savoie, where a 4,000-volt current is reduced to 550 volts, with a frequency of 25.

The third paper described proposed methods for the manufacture of silico-vanadium and of ferro-vanadium and experiments to make vanadium by the electrolysis of a fused bath containing vanadium oxide in solution, on a plan similar to that employed by the Hall process for the production of

aluminum. The electrolyte used in the experiments was calcium fluo-vanadate. The results differ from the Hall aluminum process in that the metallic product is a solid at the temperature of the bath, and hence plates out at the bottom as a metallic sheet.

A paper by Dr. A. Kjellin, electrometallurgical engineer, Metallurgiska Patent Aktiebolag, Stockholm, Sweden, was read in brief abstracts only, but was printed in full and was available at the meeting, though Mr. Kjellin was not present. The printed copy was illustrated with photographs of many furnaces in actual operation, and gave detailed design of the newest types of furnace for the manufacture of steel which is advocated by Mr. Kjellin. The paper also included production costs in detail of steel made in a three-phase, 7-ton, Rochling-Rodenhauser furnace. The fact was brought out that both the Prussian and Swiss governments considered steel rails made in the electric furnace so much superior to ordinary steel rails that they were willing to pay a higher price for them and had already placed orders for considerable amounts of such rails. The paper included specifications which the Prussian government required for electric steel rails which they were installing.

A paper by Robert Turnbull, resident American engineer for Dr. P. L. T. Heroult on "The Heroult Electric Steel Furnace," in the absence of the author, was read in abstract. The advantages of the Heroult furnace, which the author emphasized, were as follows: (1) The absence of electrical parts within the furnace proper; (2) the current is twice as efficient as when taken through the furnace bottom; (3) the heat is generated in and is greatest in the slag, which gives this sufficient fluidity; (4) the consumption of electrodes per ton of steel was found to be only 60 or 65 pounds, if cold metal was to be refined, and 15 to 20 pounds, if the steel to be refined was introduced in the molten condition. The current density used with the electrodes in this furnace is about 28 amperes per square inch, the electrodes themselves weighing about 1,200 pounds.

An interesting paper was read by Mr. FitzGerald describing the experiments made last summer at Niagara Falls for the direct production of steel by the Lash process.

A brief abstract of a paper by Remo Catani, electrometallurgist of the "Societe Elba," Portoferraio, Elba, Italy, was read at the meeting. The paper itself was printed in full and was available at the meeting. The author emphasized the necessity of building electric furnaces in much larger units, if they were to successfully compete with present day fuel-heated furnaces. Increasing the power and output of an electric furnace, increases its economy of operation. The use of monophase current was preferred by the author as giving greater efficiency in the electric furnaces than a three-phase current. The author had deduced mathematically from present furnace data, that the electro-thermic reduction of iron ores should be cheaper than that in a blast furnace, when a horsepower year costs less than two tons of coke, and was of the opinion that future large furnaces will be increased in power by raising the voltage as well as the quantity of the current.

A brief abstract was read by Carl Hering on "The Working Limit in Electrical Furnaces, Due to the 'Pinch' Phenomon." The data for the mathematical calculations were obtained by the use of mercury in a small trough. The paper was discussed by Dr. Northrup and Mr. FitzGerald.

A Discouraging View.

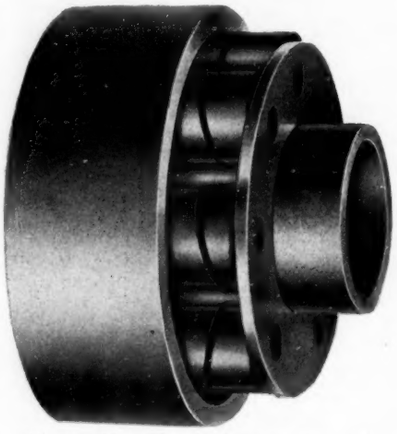
The intense enthusiasm for the future of the electric furnace in its application to the metallurgy of iron and steel, which the day's papers and discussion had brought about, was somewhat lessened by the reading of a paper by Henry D. Hibbard, consulting engineer, Plainfield, N. J., on "The Present Value of Electric Steel." His paper was an accurate summing up of the comparative value of electric steel with that in present use. It was the author's opinion that very few uses of ordinary steel would demand its refining to the extent which the electric furnace makes possible. He thought that few steel users would be willing to pay the extra price involved, in order to have a steel, whose contents in phosphorus and sulphur were as low as 0.03 per cent each, refined to a content of phosphorus and sulphur of 0.01 per cent. This view of the author brought out a valuable discussion on the advantages of specially refined steel which the electric furnace makes possible, and the fact was emphasized by several that many persons were already willing to pay the extra price for such steel.

Friday morning was devoted to the reading of papers and election of officers, Dr. L. H. Baekeland receiving the election of president for the coming year, and Prof. Richards being re-elected secretary.

Thursday evening the retiring president, Dr. Acheson, gave his closing address on the "Relations of the Electrometallurgist to the Conservation of the Country's Resources." The members then unbent for a jolly good time at the smoker which followed.

HYATT STANDARD HIGH DUTY ROLLER BEARING AND BUSHING.

The Hyatt roller bearing has been for some years familiar to machinery users, but the company has now put on the market what it designates as its high duty type of the Hyatt standard bushing, in which it has increased the safe working load per unit section by the use of high grade alloy steel with special heat treatment and



HYATT HIGH DUTY ROLLER BEARING.

the use of hardened and ground inner and outer surfaces, instead of the softer materials of the older types. The company has adhered to the well known form of Hyatt spiral roller, which, by providing a certain amount of flexibility, tends to prevent breakage of rollers under load. The company lays emphasis on the use of specially selected alloy steels, which are carefully tested before being accepted, as well as after finishing. The bearings are supplied by the Hyatt Roller Bearing Co., of Newark, N. J., with central sales offices in the Majestic building, Detroit, Mich.

The Pittsburg Coal Co.'s statement for three months ending March 31 shows an increase of 93,393 tons in the output of coke and a decrease of 619,999 tons in the coal production. The quarter's operations resulted in a net loss of $165,453, compared with $125,388 in the corresponding quarter last year.

The annual meeting of the Nova Scotia Steel & Coal Co., Ltd., will be held May 20.

Substantial Advances Recorded.

A decided impulse to speculation for the rise was given by the supreme court decision Monday on the commodity clause of the Hepburn railroad law.

Owing to the perplexing technical nature of the Hepburn law decision, considerable confusion prevailed in the market Monday after its announcement; but Steel preferred advanced to the highest price ever quoted, and Steel common to the highest price of the year. Activity characterized the market Tuesday, prices reaching the highest average of the year, but reacting sharply at the close. Another new high price was reached by Steel preferred Wednesday, but the general market reacted, and averaged lower at the close. May wheat advanced in Chicago to $1.29½, a new high price; government receipts and expenditures for April showed the smallest deficit for any month of the fiscal year so far. Less activity and some irregularity distinguished Thursday's market, Steel preferred advancing to 120⅜ and some copper stocks attaining a higher level. Copper stocks in New York and in Europe displayed buoyancy on Friday, and copper metal was higher both in this country and abroad; industrial stocks were strong, but railroad stocks rather reactionary; the government crop report estimated the average condition of winter wheat at 83.5 per cent, against 82 April 1. Saturday stocks ruled active and scored high prices, but the market later reacted.

Call money averaged about 2 per cent for the week, and there was no special change in time money rates. Over $1,000,000 in gold was engaged for export to Paris Monday, and additional gold exports were said to be in prospect later in the week. The actual figures of clearing house banks showed surplus increased $2,941,325; loans decreased, $1,521,900; deposits increased $1,109,900, and the ratio of reserve 25.8 per cent, an increase of 0.2. Non-member banks and trust companies showed loans increased $9,434,300; net deposits increased $20,171,200, and the percentage of reserve 19, a decrease of 0.1 per cent. The wheat market continued to excite some anxiety, and is being studied with much concern. Commodity price index figures, both in this country and Europe, showed a slight increase in April. Bank clearings for the week were the largest in volume since the first of the year, and compared with last week showed an increase of 12 per cent, or an increase of 33 per cent over the corresponding week last year. Improvement was noted in the railroad situation in the United States, the railway association bulletin showing a decrease on April 28 of 14,489 idle cars in the preceding fortnight. Commercial failures for the week were 243, compared with 273 the preceding week, and 305 the corresponding week last year. Shares were sold to the number of 5,452,861, compared with 3,641,749 the preceding week and 3,851,400 the corresponding week last year. Bonds, exclusive of government bonds, were sold to the amount of $38,234,000, compared with $31,605,000 the preceding week and $26,062,000 the corresponding week last year.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. May 8	Changes in Week	Date Ann.	1909 M't'g.	Stock Outstanding	Dividend Basis	Dividend Last Declared	Dividend Date Last Div. Pay.
Allis-Chalmers	16	+ ¼	Sept.	2	$19,820,000		.....	.....
Allis-Chalmers, pr	50¾	+ ¾			16,150,000	7 cum	1¾ Q.	Feb., 1904
American Can	10⅞	+ ⅜	Feb.	2	41,233,300		.....	.....
American Can, pr	78½	— ½			41,233,300.	7 cum	1¼ Q.	Jan., 1909
Am. Car & Foundry	55½	+4⅜	June	24	30,000,000		½ Q.	Jan., 1909
Am. Car.& Fdy., pr	116⅞	+4⅜			30,000,000	7 n. c.	1¾ Q.	Jan., 1909
American Loc	58⅜	+2⅛	Oct.	19	25,000,000	5	1¼ Q.	Aug., 1908
American Loc., pr	116½	+1½			25,000,000	7 cum	1¾ Q.	April, 1909
American Ship	55	+ ⅝	Oct.	13	7,600,000	4	1 Q.	June, 1908
American Ship, pr	104½	.....			7,900,000	7 n. c.	1¾ Q.	Oct., 1908
Am. Steel Foundries(new)	39	+2	Dec.	2	17,184,000		.....	.....
Am. Steel Foundries, pr	47½	.....			17,240,000	6 cum	1	Aug., 1904
Barney & Smith	30	—6	June	1	2,000,000	4	1 Q.	Sept., 1907
Barney & Smith, pr	95	.....			2,500,000	8 cum	2 Q.	June, 1908
Bethlehem Steel	26⅜	+3⅜	April	6	14,862,000		.....	.....
Bethlehem Steel, pr	56¾	+4¾			14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	37⅞	+ ¾	March	16	45,000,000*	3	1½ S. A.	Feb., 1909
Cambria Iron	46¼	— ¼			8,468,000*	4	2 S. A.	Sept., 1908
Chicago Pneumatic Tool	23	+ ½	Feb.	15	6,145,800	4	1 Q.	Oct., 1907
Colorado Fuel	40⅜	+1⅝	Oct.	18	34,235,500		3½	April, 1902
Crucible Steel	8	+⅛	Oct.	20	24,578,400		.....	.....
Crucible Steel, pr	64	+4			24,436,500	7 cum	1 Q.	Mar., 1909
Empire Steel	7	.....	April	27	1,254,770		.....	.....
Empire Steel, pr	48	+1			2,500,000	6 cum	1½ S. A.	Jan., 1909
Fay & Egan	90	.....	Feb.	18	1,000,000	7	1¾ Q.	Nov., 1908
Fay & Egan,pr	125	.....			1,000,000	7 cum	1¾ Q.	Nov., 1908
General Electric	160½	+1	May	11	65,178,800	8	2 Q.	Jan., 1909
Harbison-Walker	17	.....	Jan.	18	18,000,000		½	Oct., 1907
Harbison-Walker, pr	82	+2			9,600,000	6 cum	1½ Q.	April, 1909
International Pump	41¾	+2⅝	June	8	17,762,500		1	April, 1905
International Pump, pr	89	+3½			11,350,000	6 cum	1½ Q.	May, 1909
Lackawanna Steel	43	+11	March	10	34,971,400		.....	.....
Lake Sup. Corp	33⅝	+4⅝	Oct.	6	40,000,000		.....	.....
New York Air Brake	89⅝	+4⅝	June	17	8,012,500	8	2 Q.	Oct., 1907
Niles-Bement-Pond	100	.....	Feb.	3	8,500,000	3	1½ Q.	Mar., 1909
Niles-Bement-Pond, pr	100	.....			2,000,000	6 cum	1½ Q.	Feb., 1909
Otis Elevator Co	51	+1	March	15	6,375,300		1½ S. A.	April, 1909
Otis Elevator Co., pr	97	+1			6,295,000	3 n. c.	1½ Q.	April, 1909
Penn Steel	50	.....	May	10	10,750,000		.....	.....
Penn. Steel, pr	105	+1			16,500,000	7 n. c.	3½ S. A.	May, 1909
Pittsburg Coal Co	11⅛	+ ⅜	March	9	28,104,600		.....	Nov., 1906
Pittsburg Coal Co., pr	43¾	.....			27,071,800	7 c.	1¾	April, 1905
Pressed Steel Car	42¼	+3¼	Feb.	17	12,500,000		3	Aug., 1904
Pressed Steel Car, pr	105	+3			12,500,000	7 n. c.	1¾ Q.	Feb., 1909
Pullman	187¼	+2¼	Nov.	10	100,000,000	8	2 Q.	May, 1909
Railway Stl. Spring	44	+4½	March	4	13,500,000	2	1 S. A.	Oct., 1908
Railway Stl. Spring, pr	105	+5½			13,500,000	7 cum	1¾ Q.	Dec., 1908
Rep. Iron & Steel	26¾	+2⅛	Oct.	20	27,191,000		.....	.....
Rep. Iron & Steel, pr	87	+4½			20,416,900	7 cum	1¾ Q.	April, 1908
Sloss-Sheffield	80⅞	+3⅜	March	10	10,000,000	5	1¼ Q.	Mar., 1909
Sloss-Sheffield, pr	113	+ ½			6,700,000	7 n. c.	1¾ Q.	April, 1909
U. S. Pipe & Fdy	33	+1¾	June	23	12,500,000	2	½ Q.	Dec., 1907
U. S. Pipe & Fdy, pr	77	+2			12,500,000	7 n. c.	1¾ Q.	Sept., 1908
U. S. Steel	58	+3¼	April	19	508,302,500	2 n. c.	½ Q.	Mar., 1909
U. S. Steel, pr	119½	+4⅛			360,281,100	7 cum	1¾ Q.	Mar., 1909
U. S. Steel, 5s	104⅝	+ ⅝			463,798,000	5	5 A.	.....
Va. Iron, Coal & Coke	65	+ ¼	Sept.	21	9,073,680		.....	.....
Westinghouse Elec	84	+ ¾	June	16	27,173,200	10	2½ Q.	Oct., 1907
Westinghouse Air Brake	110	+2	Oct.	5	14,000,000*		2½ Q.	April, 1909

Par value of shares, $100, except those starred (*), $50.

Copper Stocks.

New York.—Amalgamated Copper closed 84¼, a net gain of 6¾.

Boston.—Butte Coalition closed 27½, a net gain of 3½; Calumet & Arizona closed 105, a net gain of 6½; Calumet & Hecla closed 630, a net gain of 25; North Butte Mining closed 67½, a net gain of 2¾; Quincy Mining closed 94, a net gain of 6.

Financial Notes.

The Buckeye Steel Castings Co., Columbus, O., has declared the regular quarterly dividend of 1½ per cent on preferred stock, and 1½ per cent on common, payable May 1; the Calumet & Arizona Mining Co., a dividend of $1 a share, payable June 21; the Niles-Bement-Pond Co., the regular quarterly dividend of 1½ per cent on preferred stock, payable May 15, and 1½ per cent on common, payable June 1; the Pratt & Whitney Co., the regular quarterly dividend of 1½ per cent on preferred, payable May 15.

NEWS FROM MANY INDUSTRIES

New Buyers:—

The Pneumatic Jack Co., Louisville, Ky., has been incorporated by R. S. Brown, F. J. Dittmar and E. K. Pennebaker, with $100,000 capital stock.

The Kennedy Tool & Supply Co., Cleveland, O., has been incorporated with $10,000 capital by Joel G. Fogg, E. R. Paulson, A. C. Cotter, A. C. Riddle and F. W. Cohien.

A charter has been granted to the Maumee Foundry Co., Toledo, O., through G. S. Barr, Fred Poucher, Will Poucher, C. N. Lee and C. W. Wilson, with an authorized capital of $10,000.

The Sycamore Fence Co., Sycamore, Ill., to manufacture wire fencing and kindred articles, with $100,000 capital stock, has been incorporated by Marshall Munn, John E. Hensey, Joseph B. Stephens.

The Empire Machine Co., Jersey City, N. J., to manufacture machinery, has been granted a charter with $800,000 capital stock. The incorporators are: B. S. Mantz, John R. Turner, L. H. Gunther, Jersey City.

Articles of incorporation have been filed by the Parkhurst Elevator & Mfg. Co., Peru, Ind., with $100,000 capital stock. The directors are John W. Parkhurst, Rawley M. Bouslog and Richard A. Edwards.

The Gem City Stove Mfg. Co., Quincy, Ill., has been granted a certificate of incorporation, with $175,000 capital stock. The incorporators are William H. Heidbreder, Louis C. Zander and William H. Covert.

The Freeport Windmill & Engine Co., Freeport, Ill., to manufacture machinery and agricultural implements, has been incorporated with $30,000 capital stock by Oscar J. Ziegler, Roy M. Bennthum, Fred L. Kobow.

The Diamond Tack & Nail Works, Raynham, Mass., has been incorporated to manufacture and sell tacks and nails, with a capital of $16,000. The officers are: President, David F. Ranney; treasurer and clerk, Charles B. Gardner, both of Raynham, Mass.

The Massillon Malleable Iron & Steel Cross Tie Co., Massillon, O., has been incorporated with $10,000 capital stock. The incorporators include Bernhardt F. Silver, F. A. Lange, M. B. Beals, W. E. Griffith and M. C. Broderick.

The Moore Trench Machine Co., Syracuse, N. Y., machine shop and foundry, capitalized at $5,000, has been granted a charter through these incorporators: Elizabeth V. Moore, Thomas F. Moore and William H. Harding, Syracuse, N. Y.

The New York Metal Products Co., Newark, N. J., has been chartered with $50,000 authorized capital to manufacture metal products. The incorporators include Henry M. Short, Summit, N. J.; Merrill Watson and Carl H. Watson, 225 Fifth avenue, New York City.

The Crowell Machine Co., Boston, Mass., to manufacture and sell machinery, with $6,400 capital stock, has been granted a certificate of incorporation through Robert W. Sawyer, president; J. Sidney Stone, treasurer, and Austin T. Wright, clerk, all of 161 Devonshire street, Boston.

The Greer Filter Mfg. Co., Woodbine, N. J., has been incorporated to manufacture machinery for filter plants, with a capital of $50,000. The incorporators are: Morris L. Bayard and John S. Connor, Woodbine, N. J., and Charles M. Johnstone Jr., Pittsburg, Pa.

The Eason Engine Co., with a capital of $10,000, has been incorporated by the treasurer, F. D. Gallup, Smethport, Pa. The directors include Frank H. Lowrie and Fred J. Phillips, Bradford, Pa.; Harry Eason, New York City; Fred D. Gallup and J. C. Backus, Smethport, Pa.

Charles L. Kiewert Co., New York City, manufacturer of electrical machinery, etc., with a capital stock of $20,000, has been granted a charter. The incorporators are Charles L. Kiewert and Robert W. Kiewert, both of Milwaukee, Wis., and B. F. Hessel, No. 3 Cortlandt street, New York City.

Articles of incorporation have been granted to the National Railway Devices Co., 1202 Ashland block, Chicago, to manufacture railway supplies and appliances, with an authorized capital of $200,000. The incorporators are Francis E. Hinckley, Harry J. Berman and William L. Carlin.

The Automatic Printing Machine Co., New York City, manufacturing automatic printing machines, with a capital of $50,000, has these incorporators: Benjamin N. Dorman, 52 South Sixth street, Brooklyn; Nathan D. Perlman, 25 Broad street, New York City, and Morris S. Schoenbaum, 206 Lexington avenue, Brooklyn, N. Y.

The Railway Safety Appliance Co. of Wheeling, Wheeling, W. Va., has filed application for a charter, indicating its capital stock as $500,000. The incorporators are George W. Baron, W. H. Bachman, C. A. Bowers, Thomas Carr, Nelson C. Hubbard, W. C. Love, F. A. Pierce, James Speidel, J. W. Speidel and J. W. Wright, of Wheeling, W. Va., and T. M. Work, of Steubenville, O.

The New Process Steel Co., with an authorized capital of $250,000, has been granted a charter through Treasurer Warren A. Sherwood, 142 North Duke street, Lancaster, Pa. The directors are Samuel Martin, Landis Hershey, Kinzer, Pa., R. F. D. No. 1; George D. Lefever, R. F. D. No. 4 Lancaster, Pa.; A. K. Wittmer, R. F. D. No. 2, Lancaster Pa., and A. H. Hostetter, Lancaster, Pa.

New Construction:—

P. J. Rice has awarded contracts for the erection of a foundry at 243 Lake street, Milwaukee, to cost $2,000.

The Modern Foundry & Machine Co., Paris, Ill., is planning to fit up the buildings formerly occupied by a glass factory for shops for the manufacture of welding machinery.

The Messenger & Parks Mfg. Co., Aurora, Ill., metal ceilings, cornices, etc., has awarded the contract for a two-story cement block and factory building, estimated to cost $12,000.

The Kinnear Mfg. Co., Columbus, O., manufacturer of steel rolling doors and shutters, advises that it will let contracts for the proposed addition to its plant recently noted by May 15.

Ream Bros., Broken Bow, Neb., are planning the erection of a fireproof building to be occupied as a machine shop and automobile garage, 48 x 80, partly two-story. A portion of the building will be used as a foundry, and half of it as a machine shop.

The Bauer Machine Works Co., Kansas City, Mo., has broken ground for an addition to its plant, which will increase the outside dimensions of the building from 50 x 100 feet, as at present, to 75 x 133 feet. Three stories will be added, making the structure five stories.

The Oil City Iron Works, Corsicana, Tex., has enlarged its foundry and machine shop, beside having installed new equipment, including a cupola of six-tons hourly capacity. The plant was recently purchased by William Clarkson, who had been operating it under lease for some time.

The Muhlenberg Machine Co., Dayton, O., is completing a two-story brick building on Edgar street, 30 x 130 feet, in which new machinery is being installed. This will be electrically driven. The Muhlenberg company, while transacting a general machine

business, makes a specialty of the manufacture of precision lathes.

The George N. Pierce Co., automobile builder, Buffalo, has had plans prepared for two reinforced concrete factory building additions to its plant at Elmwood avenue and the New York Central tracks; one three stories, 80 x 100 feet, and the other, two stories, 55 x 100 feet, estimated to cost $55,000.

The Reading Steel Casting Co., Reading, Pa., advises concerning proposed new construction, that it has purchased additional land now occupied by seven dwellings, which it expects to tear down where it will erect a large addition to its plant, as well as an up-to-date machine shop. The question of equipment has not been considered by the company as yet.

The F. R. Patch Mfg. Co., Rutland, Vt., has let the contract to the McClintic-Marshall Construction Co., for erecting the steel frame work of a shop building 50 x 200 feet. In the shop will be installed a 15-ton traveling crane and a large planer. The building will be ready for occupancy Sept. 1.

The Garrett Machine Co., Garrett, Ind., manufacturer of the Garrett gas engine, auto buggies, advises that it has increased its capital from $15,000 to $30,000, for the purpose of making improvements to its plant, and adding new machinery. It manufactures a high wheel motor vehicle, and expects to be able to put out from four to nine cars per week.

The Indiana Foundry Co., Ltd., Indiana, Pa., manufacturer of foundry hardware and machinery, advises that it has added 25 per cent to its foundry buildings, thus enabling it to largely increase its facilities for making sand drying stoves. Its business in these stoves is growing rapidly, and it will endeavor in the future to secure a much larger building than it at present occupies.

The Jeffrey Mfg. Co., Columbus, O., advises respecting the proposed new construction recently noted, that a steel stock building 110 x 250 feet has been erected to cover a portion of the 650-foot stock runway under a 100-foot 15-ton Gantry crane. Under cover of this building, such steel stock will be kept as is not perishable or apt to be damaged in any way by exposure. The building will also be used for the cutting of raw steel stocks into lengths for the entire plant.

Work will be started shortly on the erection of buildings for the Duroth Mfg. Co., Seward, Pa. The company was recently chartered with a capital of $50,000 for the manufacture of car wheels as well as mine and railroad supplies. It is planned to begin operating early next month. One of the devices to be manufactured is a car truck with a self-oiling axle, the invention of Mr. Duroth. Among the directors of the company are George Fockler, John Weir, of Johnstown, Pa.

The Ohio Forge Co., Cleveland, machine and automobile forgings, which recently increased its capital stock from $10,000 to $100,000, advises that the increased capital is for the purpose of enabling the company to provide itself with facilities demanded by increasing business. It has purchased the plot of land next north of its plant on East Sixty-fifth street, and is erecting thereon a machine shop to be equipped with a complete line of die making and finishing machinery. This machine shop it expects to have operating by June 1, and this, in addition to its installing probably two extra hammers, will provide the necessary increased facilities.

General Industrial Notes:—

The Swain Engine Co., of Chicago, has increased its capital stock from $20,000 to $30,000.

The Marion Steam Shovel Co., Marion, O., has increased its capital stock from $1,000,000 to $1,500,000.

The Davis Mfg. Co., Milwaukee, machinery and hardware specialties, has increased its capital stock from $50,000 to $100,000.

The Shelby Steel Tube Co., of New Jersey, through B. C. Moise, assistant secretary, has filed notice of withdrawal from business in Indiana.

The charter of the Richmond Iron Works, Richmond, Va., has been amended, making the capital stock not less than $35,000 nor more than $150,000.

The Berger Mfg. Co., Canton, O., sheet metal specialties, has been authorized to do business in Indiana with $40,000 capital stock represented in that state.

The Pennsylvania Steel Co. has received a contract from the Buffalo, Rochester & Pittsburg railroad for 2,500 tons of steel to be used in reconstructing track bridges and trestles on the Clearfield division.

The Camden Iron Works, Camden, N. J., has secured contracts for the construction of five large gas holders, three to go to California and two to Mexico, the contract price being over $1,500,000.

The American Foundry & Construction Co., Pittsburg, advises concerning its recent fire that the only building damaged was the foundry, and that only slightly. Repairs have been made, and the foundry is again in operation.

The Dominion Iron Works, Bristol, Tenn.-Va., a consolidation of the Bristol Stove & Foundry Co., of Bristol, and of the Johnson City Foundry & Machine Works, Jonnson City, Tenn., has been organized with $50,000 capital stock.

The attempted re-organization of the Capitol Lock Nut & Washer Co., Columbus, O., has not met with success, and the property will be sold May 29. There is said to be a possibility that some of the old stockholders may buy the property in.

Following the sale by the receiver of the plant of the Fairbury Iron & Windmill Works, Fairbury, Neb., a re-organization has been effected, and the new company will be known as the Fairbury Windmill Co., of which John Simpson will be the manager.

Among the industries located at Sidney, O., which were damaged by a wind storm, April 29, were the Sidney Pole & Shaft Co., which sustained a loss of probably $30,000 on the building and machinery, and the Sidney Foundry Co.

The Ralston Steel Car Co., Columbus, O., has secured an order for 50 fifty-ton drop bottom cars from the Manchurian railway, and it is said that this is but the first lot of a number of cars which the Japanese company will eventually order from the Columbus concern.

The Buena Vista Foundry Co., Buena Vista, Va., has been re-organized and these new officers chosen: President, W. T. Robey; vice president, H. M. Long; secretary and treasurer, B. E. Heywood, who with W. T. Paxton and M. D. Campbell compose the board of directors. The new company is planning to enlarge the plant and increase the output.

The West Tennessee Sheet Iron Works, has been organized at McKenzie, Tenn., by J. L. Thompson, W. E. Reginald, C. M. Wrinkle, F. D. Walpole and B. K. Lowrence. Mr. Walpole will be general manager of the company, which will engage in the manufacture of cornice work and sheet metal products. Machinery has been purchased and established in a building heretofore used as an opera house.

The Robinson Combination Steel Wrench Co., Inc., Gary, Ind., whose incorporation was recently noted, advises that it is having its combination wrench, hammer, pliers, wire cutter, etc., manufactured by Moore & Co., Chicago, die maker and machinist, and it expects to be able to place its tools on the market within two or three

weeks. It will handle tools through jobbers, and possibly agents.

The Bethlehem Steel Co. has received an order from the war department contracting for 1,600 7-inch target shells at $10.48 each; 1,000 8-inch shells at $17.86 each, and 600 10-inch shells at $32.70, the total contract price being $53,248. The Tredegar Iron Co., Richmond, Va., was awarded the contract for furnishing 1,200 12-inch cast iron shells, at $32 each.

At the annual meeting of the Ames Steel Lath Co., St. Louis, recently, the following directors were elected: President, Henry Semple Ames; vice president, Henry S. Turner; secretary, W. W. Steele; directors, Lucy V. Semple Ames and Mary Ames Cushman. This company owns the patent on the rotary process of expanding sheet metal, and has developed a large trade. It has also a number of licensees in various parts of the country.

The Minneapolis Crucible Steel Co., Minneapolis, Minn., which was recently organized with a capital of $100,000, by G. L. Fort, president and treasurer; F. E. Crary, secretary, and Otto Reiske, vice president and general manager, has purchased a lumber company's plant and is installing machinery, at Columbia Heights. The company plans to manufacture automobile parts, farm machinery and cars, and will begin business in 30 days.

Albert H. Hoffman has opened offices as a manufacturers' agent at 328 Hutton building, Spokane, Wash. Mr. Hoffman has been appointed northwestern agent for the Taylor Iron & Steel Co., the Handlan, Buck Mfg. Co., of St. Louis, W. Bingham Co., of Cleveland, Chas. W. Hill, of Forest City, Ill., and several other eastern manufacturers. Mr. Hoffman has warehouse facilities in Spokane which insure prompt deliveries from stock.

The Maumee Foundry Co., Toledo, O., whose incorporation is noted in another column of this issue, has been organized to take over the business of the Ohio Foundry Co., doing a general gray iron and brass foundry business for the past four years. The new company has the following officers: President and treasurer, George B. Carr; secretary, William Poucher; general manager, Fred Poucher. The plant of the company will be located on Dorr street.

The Enterprise Foundry & Machine Works, Bristol, Tenn., has announced that it will establish a car wheel manufacturing plant at Shelby street and the Virginia & Southwestern railway. Asa W. Whitney, who has been connected with the Sanford Day Iron Works of Knoxville, has become interested in the Bristol company, and will remove to Bristol to aid in the establishment of the new plant. The company will manufacture mine car wheels and a general line of mine equipment.

Business has picked up to such an extent with the Ashland Fire Brick Co., Ashland, Ky., that it expects to put its Hayward plant, at Hayward, Ky., in operation this week. The company has orders on its books from 16 different states, and its sales so far this year are about 10 per cent ahead of last year, which is noted as rather unusual.

The American Oil Engine Co., 1779 Broadway, N. Y., which was recently organized to purchase the assets of the International Oil Engine Co., is starting out under very flattering conditions, with a very satisfactory number of orders booked ahead. The company has found its new multiple cylinder engine one of the most economical power producers now manufactured, this multiple cylinder engine enabling the company to enter into the manufacture of large units, from 50 up to 1,000 horsepower.

The Warren Steel & Iron Co., Warren, O., advises respecting its recent incorporation that it was organized for the purpose of taking over by purchase the Penn Shovel Mfg. Co.'s plant at Warren, from the receivers, W. Gordon Brown and Clay M. Hanna. It expects to operate the rolling mill in the future for the purpose of manufacturing sheet steel, but will not operate the shovel factory for some little time. It has purchased all the necessary machinery that it will need for the present.

The Wisconsin Engine Co., of Corliss, Wis., has recently put into service the second engine sold to the Oliver estate in Pittsburg. This engine, which is installed in the Central power plant, is a 900-horsepower vertical cross compound Corliss engine operating at 120 revolutions per minute and direct connected to a 600-kilowatt direct current generator. A Wisconsin Corliss engine of the same capacity but of the horizontal cross compound type has been in very successful operation in the same engine room for several years.

This company has also recently put into service smaller engines sold to the J. M. Kohler Co. of Sheboygan, Wis., and to the Racine Mfg. Co. of Racine, Wis.

The annual meeting of the Jones & Laughlin Steel Co. was held at Pittsburg April 27 and the present executive officers were re-elected for the ensuing year. These are: President, B. F. Jones Jr.; vice president and general sales agent, Willis L. King; vice president and general manager, Wm. Larimer Jones; treasurer, Jas. B. Laughlin; secretary, Wm. C. Moreland; assistant treasurer, Thos. K. Laughlin; auditor, Wendell Van Hook. G. M. Laughlin Jr. was made a member of the executive committee to fill the vacancy caused by the death of Major Geo. M. Laughlin. Recently T. K. Laughlin was elected to take Major Laughlin's place as a director of the company. Work on the new Aliquippa plant is proceeding slowly, but greater activity is likely to be inaugurated soon if general conditions continue to improve.

Trade Notes:—

The Massey Vise Co., Chicago, has removed to its new plant, 208-210 Michigan street, where with its increased line of vises for bench, planer and milling works, it is now prepared to care for the wants of the general trade.

The Dubois Iron Works, Dubois, Pa., has appointed as its New England representative, James L. Kimball, 53 State street, Boston, and for its general sales agent for eastern Pennsylvania, Delaware and the southern half of New Jersey, the James F. Marshall Co., of Philadelphia.

The firm of Stockdale-Canterbury Co., has been organized to transact a selling agency business. The company have opened offices in the Association building, 153 LaSalle street, Chicago. Mr. Stockdale was formerly auditor and purchasing agent of the Calumet Engineering Works, Harvey, Ill.

Fires:—

The warehouse at San Francisco, of the Simmons Mfg. Co., of Kenosha, Wis., was recently seriously damaged by fire, with a loss of probably $50,000, fully covered by insurance.

The Crown Mfg. Co., 2820 Western avenue, Cincinnati, sustained a loss estimated at $1,200 in its foundry, department, April 29. The same fire damaged the wire goods plant of the H. Belmer Co., to the extent of about $800. Both losses are covered by insurance.

The stove works of the Wehrle Co., Newark, O., was badly damaged May 5, entailing a loss estimated from $175,000 to $225,000. The fire was started by the explosion of hot tar in the molding department. Two wings of the plant, two stories, each about 1,000 feet long, were destroyed. They had been erected only a short time before.

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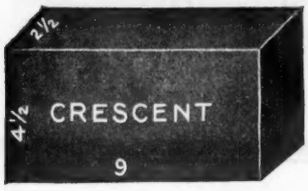

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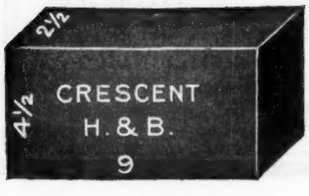

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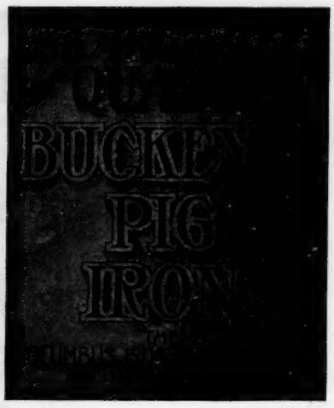

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Notice is hereby given that on Saturday, the 29th of May, 1909, at 11 o'clock a. m., at the door of the Court House in the City of Columbus, O., Charles P. Outhwaite, as receiver of the Capitol Lock Nut & Washer Company, will offer for sale at public auction at not less than $45,000 all of the real estate, buildings, fixtures, office and shop furniture, supplies, engines, machines, machine tools, stock on hand finished and unfinished, tool steel, tools, dies and patents, being all of the property of the Capitol Lock Nut & Washer Company used in connection with its plant and business, saving and excepting the accounts receivable, money in bank and on hand, said property being appraised at $76,400.23 and the same will be offered for sale as a whole and for not less than $45,000.

The real estate above mentioned is described as follows: being a certain piece of ground situate in the County of Franklin, State of Ohio and in the City of Columbus, and being lots Nos. 48, 49, 50, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122 and 123 of Johnson's South Grove Addition to the City of Columbus, O., as the same are numbered and delineated on the recorded plat thereof of record in Plat Book No. 7, pages 166 and 167. Recorder's Office, Franklin County, O., and also including the streets and alleys recently vacated on which said lots bounded and abutted.

TERMS OF SALE, one-third upon confirmation of sale, one-third in three months and balance in six months from date of confirmation of sale, the deferred payments to bear interest at the rate of six per cent until paid and to be secured to the satisfaction of the receiver.

CHARLES P. OUTHWAITE, Receiver

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Every Foundry and Pattern Shop Should Have.

FOUNDRY WORK. By Wm. C. Stimpson, Head Instructor in Foundry Work and Forging, Department of Science and Technology, Pratt Institute. 160 pp., 150 illus. Cloth binding. A practical guide to modern methods of molding and casting in iron, brass, bronze, steel, and other metals, from simple and complex patterns, including many valuable hints on shop management and equipment, useful tables, etc. **Price $1.00**

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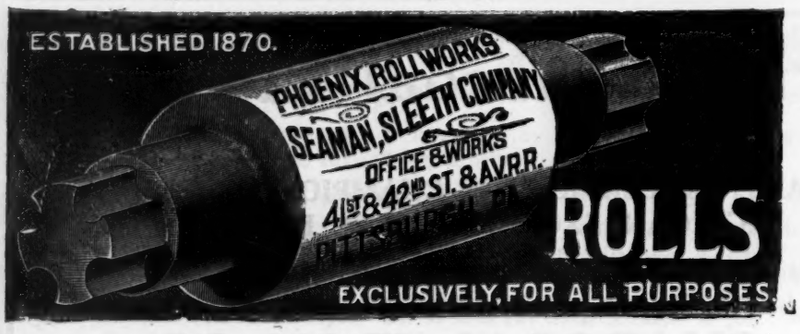

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1 Power House 40' x 70'.
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2 47½" x 120' heavy double leather belts.

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Any advertisement appearing in the liner columns of THE IRON TRADE REVIEW, will be given one insertion free of charge in PENTON'S LIST, and when such advertisement is one that would be of interest to the foundry trade, it will likewise be given one insertion free of charge in THE FOUNDRY.

POSITIONS VACANT.

FOUNDRY AND MACHINE COMPANY situated in the Clearfield district, manufacturing mine cars, general mine equipment, and repair work, requires a competent man, of middle age, sober and experienced, to act as General Manager and build up the organization and sales of the company. One who can take an interest preferred. Exceptional references required. Address Box 459, THE IRON TRADE REVIEW, Cleveland, O. I.T.R.

GENERAL FOREMAN WANTED FOR structural steel shop. Must be competent to introduce best modern shop practice with efficiency in fabricating bridges, buildings, etc. Good opening for right man. State experience, age and salary expected. Address J. H. Gallagher Chf. Eng. Steel Dept., Northwest Bridge Works, Portland, Ore. I.T.R.

EXPERIENCED MAN ON AUTOMOBILE cylinder molds and cores wanted, who has been foreman, assistant foreman or workman. Thorough knowledge required. State experience and qualifications. Address Standard Foundry Co., Buffalo, N. Y. I.T.R.

MECHANICAL DRAFTSMAN WANTED for machine and general work. Answer, stating age, experience, and salary wanted, by addressing Box 457, THE IRON TRADE REVIEW, Cleveland, O.

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POSITIONS WANTED.

POSITION WANTED BY FIRST-CLASS foundry foreman, held present position for 10 years, would like a change; 20 years' experience as foreman on all classes of light and heavy engine work, and mining machinery of all kinds. Good mixer and melter of both iron and brass. Will take charge of pattern shop in connection with foundry if so desired. Best of references as to ability; an up-to-date hustler, sober and reliable; can produce results; shop in middle west or coast preferred. Address Box 61, PENTON'S LIST, Cleveland, Ohio. p.

POSITION DESIRED AS SUPERINtendent or assistant superintendent of farm implement concern by practical, wide-awake married man 35 years of age—expert in designing and manufacturing farm implements—draftsman, patternmaker and foundryman—four years with the International Harvester Co., 15 years with other important farm implement concerns. References unquestionable. Address Box 85, PENTON'S LIST, Cleveland, Ohio. p.

WANTED BY AN UP-TO-DATE ENERgetic young foundryman, position as superintendent or foreman of plant, where a hustler is needed. Heavy machinery or engine work preferred. Can produce results with minimum cost. Good handler of men, expert on labor saving devices and mix by analysis. References. Address Box 82, PENTON'S LIST, Cleveland, O. p.

POSITION WANTED BY FOREMAN PATternmaker, 20 years' experience on all classes of work, large work especially. Familiar with molding machines and metal patterns. Capable of taking charge of foundry; 8 years superintendent of pattern department and foundry. Steady, sober and reliable, practical mechanic in both trades. Best of references. Address Box 80, PENTON'S LIST, Clevland, O. p.

POSITION WANTED BY MACHINE patternmaker, age 36, married, sober and steady; 15 years' experience, past three years assistant foreman in large plant in Philadelphia. Competent in handling men and drafting—willing to work. A-1 references as to character and ability. Eastern Pennsylvania preferred. Address Box 83, PENTON'S LIST, Cleveland, O. p.

POSITION WANTED BY FOUNDRY foreman. Can take care of any kind of work. Married and sober. Would like to put a little money in a small foundry. Address Box 78, PENTON'S LIST, Cleveland, O. p.

POSITION WANTED AS SUPERINTENDent or foreman by a thoroughly competent and experienced foundryman, on machinery or jobbing work. Competent to take entire charge of foundry and handling of men. Sober and a hustler. Best of references. Address Box 87, PENTON'S LIST, Cleveland, Ohio. p.

BY YOUNG MARRIED MAN, FORMERly purchasing agent for large railway equipment company, especially experienced in buying iron and steel and their products, also other material used in manufacturing railway equipment. Thoroughly familiar with trade. Can systematize detail work. Address Box 437, THE IRON TRADE REVIEW, Cleveland, O.

POSITION WANTED AS SUPERINTENDent of malleable plant—can build furnaces, annealing ovens and core ovens and operate same successfully. Have had 14 years experience as foreman and superintendent of malleable and agricultural grey iron shops. Can give the best of references. Address Box 75 PENTON'S LIST, Cleveland, O. p.

WANTED POSITION AS FOREMAN IN foundry, making light and medium weight gray iron castings—21 years experience in foundry, 12 years as foreman in shops making light castings. Up-to-date in cupola practice, mixing and melting iron, molding machines and handling help. Open shop preferred—can furnish references. Address Box 77 Penton's List, Cleveland, O. p.

POSITION WANTED BY FOUNDRY foreman, one accustomed to light and heavy gray iron castings. Some experience with molding machines. Understands the running of cupolas, mixing iron—can handle men to good advantage. Strictly temperate and steady, and can give good references. Address Box 84, PENTON'S LIST, Cleveland, O. p.

BY TECHNICAL MAN EXPERIENCED in all branches of the small converter business. Able to install plant and take full charge. Correspondence invited with parties contemplating installation. Address Box 456, THE IRON TRADE REVIEW, Cleveland, O.

POSITION WANTED BY AN EXPERT molding machine and metal pattern maker, as foreman in molding machine shop, or else taking care of machines in a large foundry. I have 22 years of experience to back me (all with one firm). Address Box 81, PENTON'S LIST, Cleveland, O. p.

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AN UP-TO-DATE FOUNDRYMAN WISHes to correspond with firm considering the installation of steel converter—will furnish list of the cost of equipment and installation and the manufacture of steel, with view of taking stock. Address Box 79 Penton's List, Cleveland, O. p.

FOR SALE. HALF INTEREST IN A $25,000 foundry and machine company located near Chicago on six R. R. Party who could handle the machine shop preferred. Address Box 461, THE IRON TRADE REVIEW, Cleveland, Ohio. I.T.R.

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EXCELLENT WATER POWER AND FACtory site for rent or sale. Good town of 1500. Cheap help plentiful. Address Merritt Mfg. Co., Constantine, Mich. p.

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WANTED, A SECOND-HAND OR NEW ice plant of from 20 to 50 tons capacity, must be in good order and cheap. Prompt reply wanted. Address Edgar A. Weimer, Lebanon, Pa. p.

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